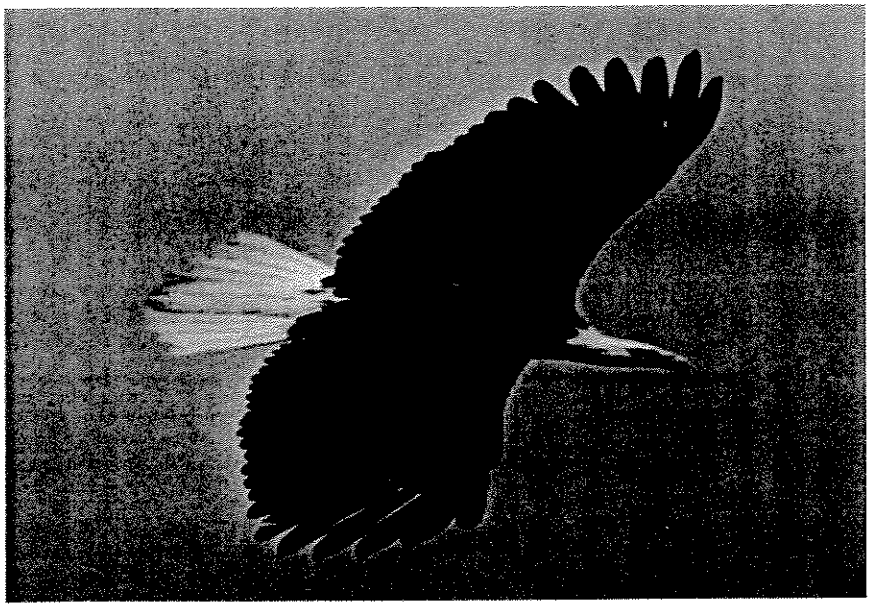

Feasibility Study for Reestablishment of Bald Eagles on the northern Channel Islands, California

FINAL ENVIRONMENTAL ASSESSMENT

MONTROSE SETTLEMENTS RESTORATION PROGRAM

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. FISH AND WILDLIFE SERVICE, NATIONAL PARK SERVICE, CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA STATE LANDS COMMISSION, AND CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

May, 2002

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Preface

I. Public Meeting

A public meeting was held on the draft Feasibility Study/Environmental Assessment (FS/EA) on March 28, 2002 at the Channel Islands National Park Visitor Center, in Ventura CA.

The Trustees provided a general overview of the Feasibility Study and accepted both oral and written comments on the plan. The final version of the document can be viewed at the MSRP website at http://www.darcnw.noaa.gov/montrose.htm

II. Comments

Scoping is a process the Trustees used to determine environmental issues and alternatives for this project. Scoping was performed internally (Trustee agency specialists), and externally (State and Federal agencies, interested and affected public) to determine the environmental issues and alternatives listed below.

External scoping was initiated by sending a letter that described the proposed action to the affected and interested public. The letter asked interested participants to send their comments, issues, or concerns regarding the proposed action. For this project 38 scoping letters were sent out and the Trustees received eight written comments on the project proposal. In addition, the draft Feasibility Study/Environmental Assessment (FS/EA) was subject to a 30 day public review period. The Trustees sent out 38 copies of the draft FS/EA and received three public comments on the draft FS/EA.

The Trustees considered comments received during the public comment period before completing decision making regarding the Feasibility Study. Appendix B contains the Trustees responses' to public comments received during the comment period. Public review of the FS/EA is consistent with all federal and state laws and regulations that apply to the NRDA process including NEPA, as amended (42 USC 4371 *et seq.*), and its implementing regulations (40 CFR Parts 1500-1508).

Executive Summary

The Montrose Settlements Restoration Program (MSRP), on behalf of its member agencies, is developing a comprehensive restoration plan and programmatic environmental impact statement to restore the marine resources injured by the release of DDTs and PCBs into the marine resources of the Southern California Bight, including the Channel Islands National Park. The overall effort is aimed at restoring, replacing, rehabilitating, or acquiring the equivalent of the injured natural resources and services. The State and Federal trustees overseeing this process have determined that, concurrent with the overall planning effort, an approximately five-year study should be conducted to determine the feasibility of recolonizing the northern Channel Islands with bald eagles (*Haliaeetus leucocephalus*) given the continued presence of DDT. Information gained from this feasibility study regarding the success of the reintroduced eagles will be incorporated in the development of the comprehensive restoration plan.

From the late 1940s to the early 1970s, industries in the Los Angles area discharged millions of pounds of DDTs and PCBs into ocean waters off the Southern California coast. Almost all of the DDTs originated from the Montrose Chemical Corporation's manufacturing plant in Torrance, CA and were discharged into Los Angeles County sewers that empty into the Pacific Ocean at White Point, on the Palos Verdes shelf. Montrose also dumped hundreds of tons of DDT-contaminated waste into the ocean near Santa Catalina Island.

In late 2000, the state and federal governments settled the final remaining legal claims brought in 1990 against several companies for releasing DDTs and PCBs into southern California coastal waters. A total of $140 million in damages has been paid under four separate settlement agreements. These funds will be used to support two types of activities under the Superfund Law. The U.S. Environmental Protection Agency and the California Department of Toxic Substances Control will use a portion of the funds to reduce exposure to DDT and PCBs, for example, by covering contaminated sediments with clean sediments. In addition, the Natural Resource Trustees (the United States Fish and Wildlife Service, National Oceanic and Atmospheric Administration, National Park Service, California Department of Fish and Game, California State Lands Commission, and the California Department of Parks and Recreation), will use a portion of the funds to restore natural resources that were harmed by these releases of DDTs and PCBs into the marine environment.

Bald eagles were a resident breeding species on all eight of the California Channel Islands. It is estimated that a minimum of 35 eagle nest sites existed on the Channel Islands earlier in this century, making the Channel Islands the stronghold for this species in Southern California. Between the mid-1940s and early 1960s, bald eagles disappeared from all of the Channel Islands. Bald eagles have not naturally reestablished on the Channel Islands and those that have been released by humans on Santa Catalina Island have not been able to naturally reproduce due to DDT contamination. It is uncertain if a breeding population of bald eagles can be successfully reestablished on the northern Channel Islands. Bald eagles were identified as one of the primary injured resources in the Montrose case and they continue to be impacted by DDT contamination.

The Feasibility Study will consist of the following actions:

- Releasing captive-bred or translocated wild nestling bald eagles on Santa Cruz Island using previously developed techniques.
- Monitoring contaminants in the released birds, their eggs and their food to determine if concentrations of DDTs are present which may impact the ability of the eagles to successfully reproduce.

The trustees have drafted this Feasibility Study and Environmental Assessment (FS/EA) and are initiating public review of the plan in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The Trustee agencies invited public comment on the alternatives discussed in this proposed FS/EA to assist them in considering what environmental impacts implementation of the alternatives may have.

Document Overview

This document is organized into the following sections:

Section 1 Purpose, Need, and Proposed Action

The Montrose Settlements Restoration Program (MSRP) Trustee Council is beginning the development of a comprehensive restoration plan and programmatic environmental impact statement (PEIS) to restore the natural marine resources injured by the release of DDTs and PCBs into the southern California bight. The overall effort is aimed at restoring, replacing, rehabilitating, or acquiring the equivalent of the injured natural resources and services. The State and Federal Trustees overseeing this process are proposing that, concurrent with the overall planning effort, an approximate five-year study will be conducted to determine the feasibility of recolonizing the northern Channel Islands (NCI) with bald eagles (*Haliaeetus leucocephalus*) given the continued presence of DDT contamination in the food web of the Southern California Bight. If the trustees have determined to move forward with the feasibility study, following public input and review, and the data collected will be used in the development of the comprehensive restoration plan.

An additional purpose of this proposed *Feasibility Study for Reestablishment of Bald Eagles on the northern Channel Islands, California-Environmental Assessment (FS/EA)* is to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Trustee agencies invited public comment on the alternatives discussed in this proposed FS/EA to assist them in considering what environmental impacts implementation of the alternatives may have.

BACKGROUND/OVERVIEW

From the late 1940s to the early 1970s, industries in the Los Angles (L.A) area discharged millions of pounds of DDTs and PCBs into ocean waters off the Southern California coast. Almost all of the DDTs originated from the Montrose Chemical Corporation's manufacturing plant in Torrance, CA and were discharged into Los Angles County sewers that empty into the Pacific Ocean at White Point, on the Palos Verdes shelf. Montrose also dumped hundreds of tons of DDT-contaminated waste into the ocean near Santa Catalina Island. DDTs refers to a mixture of similar chemicals widely used as pesticides starting in the 1940s. The U.S. banned the use of DDTs in 1973. PCBs (polychlorinated biphenyls are a group of 206 related chemicals once widely used in electrical transformers, hydraulic fluids and paints.

In 1992 and 1993, surveys by the United States Geological Survey (USGS) found that more than 100 metric tons (110 US tons) of DDTs and 10 metric tons (11 US tons) of PCBs remained in the sediments on the ocean bottom of the Palos Verdes Shelf (Lee et al. 1996). The highest concentrations of DDTs and PCBs were near the mouth of the White Point sewer outfall, at water depths from 40 to 80 m (130 - 260 ft) deep. Subsequent surveys by the Southern California Bight Pilot Project showed that elevated concentrations of DDTs and PCBs in bottom sediments extended from the Palos Verdes Shelf and into Santa Monica Bay.

Numerous independent studies have shown that the DDTs and PCBs still contaminate marine life and birds in Southern California and continue to harm these natural resources. Sportfish in the L.A. area (approximately 50 species in eight groups) have levels of DDTs that exceed the State of California trigger level (0.1 ppm). Several of these sportfish also have concentrations of PCBs that exceed State of California trigger levels. Consequently, the State of California has issued health advisories warning consumers to limit or avoid consumption of these fish at certain coastal locations off Los Angeles and Orange Counties. In addition, due to the high levels of DDTs and PCBs present in white croaker, the

State imposed bag limits for this species and banned commercial fishing for white croaker near the Palos Verdes Shelf.

By present estimates, DDTs and PCBs will continue to contaminate marine resources and birds in Southern California for decades. According to USGS studies (Drake et al. 1995, Lee et al. 1996, Sherwood et al. 1996), at least half of the present mass of DDTs on the Palos Verdes Shelf is expected to remain on the Palos Verdes Shelf through the year 2100.

Natural Resource Claim

In 1990, the U.S. Department of Justice (DOJ) and the California Attorney General filed a lawsuit under the Comprehensive Environmental Response, Compensation and Liability Ac of 1980 (CERCLA or Superfund) 42 U.S.C. 9601 et seq, alleging that a number of defendants were responsible for releasing DDTs and PCBs and other hazardous substances into the environment. The lawsuit charged that the DDTs and PCBs injured natural resources, including fish and wildlife that live in and around coastal waters in Southern California.

On December 19, 2000, the state and federal governments settled the final remaining legal claims brought in 1990 against a number of defendants for releasing millions of pounds of DDTs and PCBs into the coastal waters off Los Angeles. A total of $140 million in damages have been paid under four separate settlement agreements. As required under the Superfund Law, the Trustees will use approximately $30 million to restore public resources harmed by releases of DDTs and PCBs off the coast of Southern California. In addition, approximately half of the funds will be used by the U.S. Environmental Protection Agency and California Department of Substances Control to reduce exposure to DDTs and PCBs, which may include covering contaminated sediments with clean sediments. The remainder of the monies will cover costs incurred by the MSRP Trustees to develop evidence and adjudicate the case.

Natural Resource Trustees and Authorities

Both Federal and State of California laws establish liability for natural resource damages to compensate the public for the injury, and the loss of such resources and or/their services resulting from the release of hazardous materials. This Feasibility Study/Environmental Assessment (FS/EA) is being conducted pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1990 (CERCLA), the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

This FS/EA has been prepared jointly by the MSRP Trustees: the National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), California Department of Fish and Game (CDFG), California State Lands Commission, and California Department of Parks and Recreation.

The MSRP Trustees are responsible for developing and carrying out the Montrose Settlements Restoration planning process. These Trustees represent the interests of the public in assessing damage to and restoring the public's natural resources. A Trustee Council, consisting of representatives of the MSRP Trustees, has been formed to oversee the restoration planning and implementation.

BALD EAGLES IN SOUTHERN CALIFORNIA

DDTs and PCBs Injuries to Bald Eagles

Bald eagles were a resident breeding species on all of the California Channel Islands from before the turn of the century until at least the 1930s (Willett 1933, Kiff 1980). Ornithologists and egg collectors reported

bald eagles to be common on the northern Channel Islands between the late 1800's through the 1930's. From the 1800's to 1950, bald eagle nesting areas were reported from a minimum of 35 different locations on the islands, making the Channel Islands a stronghold for this species in Southern California (Kiff 2000). However due to the lack of systematic surveys this number is likely an underestimate. The last confirmed nesting of an eagle on the Channel Islands was in 1949 (Kiff 1980).

Little published information is available regarding the status of bald eagles on the Channel Islands after the 1940s, but a few adult birds continued to be observed on some of the islands into the late 1950s and 1960s. Catalina residents remember seeing eagles up until the middle to late 1950s (Kiff 1980, Garcelon 1988). By the early 1960s, bald eagles had disappeared from all of the Channel Islands. Timing of the decline of eagles on the Channel Islands coincided closely with the loss of peregrine falcons (*Falco peregrinus*) and bald eagles from other portions of their North American range as a result of egg-shell thinning effects of DDE (Kiff 2000, Garcelon 1988). The reduction of bald eagle populations in many areas of the country has been correlated with high levels of organochlorine compounds and specifically with metabolites of DDTs (Stickel et al. 1966, Krantz 1970).

Raptor species, such as bald eagles and peregrine falcons, are particularly susceptible to these contaminants because they are high trophic level predators. DDE, a breakdown metabolite of the synthetic pesticide of DDT, has been demonstrated to cause eggshell thinning and subsequent reproductive failure in many species of birds feeding in the marine ecosystem. DDE in the diet of the bald eagle have negatively affected its' ability to produce young. The continuing influence of this contaminant also accounted for the inability of these raptors to recolonize the islands after other sources of mortality had ceased (Kiff 2000).

Because DDTs and PCBs are slow to break down and are strongly attracted to fats, they bioaccumulate and become more concentrated in animals at higher levels in the foodweb. When feeding on food contaminated with DDE and PCBs, animals at the top of the foodweb, like bald eagles and peregrine falcons, can accumulate harmful concentrations of these chemicals. This same effect has been documented in brown pelicans (*Pelecanus occidentalis*), peregrine falcons, and cormorants (*Phalacrocorax* spp.).

Additional Factors in Eagle Population Decline and Conservation Actions

Other factors in addition to DDTs contributed to the decline of bald eagles in Southern California. These included historical persecution by humans (egg collecting and shooting) (Kiff 1980), and limited nesting opportunities on the mainland of southern California due to development and recreation (Kiff 1980). .

Bald eagles are currently listed as threatened under the Endangered Species Act (ESA), but have been proposed for de-listing due to substantial recovery of the species on the mainland. The U.S. Fish and Wildlife Service (USFWS), in its Bald Eagle Recovery Plan, set recovery goals for bald eagles for specific zones in California. The Bald Eagle Recovery Plan indicates that the most suitable habitat in southern California is on the Channel Islands, especially Santa Cruz and Santa Catalina Islands (Jurek 2000, USFWS 1986). The zone containing the Channel Islands has not met its recovery goals with respect to the number of breeding pairs. Successfully reestablishing eagles to the northern Channel Islands would assist in meeting this objective.

Historic Bald Eagle Numbers on the Northern Channel Islands

Kiff (2000) showed a minimum of 24 different bald eagle nesting territories on the northern Channel Islands (Anacapa, Santa Cruz, Santa Rosa and San Miquel) with a maximum of 14 nesting pairs reported in the same year on those islands. Historically, Santa Cruz Island regularly supported a minimum of at least five pairs of bald eagles, which nested in niches and potholes on the sea cliffs (Kiff 1980). Known nesting areas on Santa Cruz included Pelican Bay, San Pedro Point, Blue Banks, Valley Anchorage,

Chinese Harbor, Potato Harbor, and Middle Grounds. Nearby Anacapa Island had as many as three nesting pairs in some years. Kiff estimates that the northern Channel Islands supported at least 10 nests, and probably more, at any one time. However, since collectors or ornithologists did not visit large portions of these large islands very often, if at all, these estimates are likely an underestimate. This claim is cooperated by the fact that a boat survey of the northern Channel Islands conducted in 1999 found a remnant bald eagle nest at Del Mar Cove, Santa Cruz Island, that had not been previously documented.

Ecological Role of Bald Eagles

Bald eagles historically played an important role in the ecology of the Channel Islands by serving as both a top carnivore and a scavenger. Bald eagles prey primarily upon fish taken live from the ocean; however they also feed upon seabirds and the carcasses of animals that wash up on shore.

The bald eagle functions as a top-level coastal predator and scavenger. There is no other species that plays the same ecological role as the bald eagle. In the absence of bald eagles on the northern Channel Islands, golden eagles (not native to the NCI) have become established on Santa Cruz Islands. Nesting adult bald eagles defend territories and would have excluded golden eagles from establishing on the islands. The golden eagle, a terrestrial predator, has had tremendous negative impacts on native island foxes, a species that does not have evolutionary adaptations to avoid predation (Coonan 2001, Roemer 1999).

In addition to their role in the balance of natural systems, bald eagles were revered by Native American cultures historically occupying the Channel Islands and are still admired and valued by people for whom the eagle is both a striking bird and our American symbol.

RESTORATION ACTIONS IN SOUTHERN CALIFORNIA FOR BALD EAGLES

In 1980, the USFWS and the Institute for Wildlife Studies (IWS), with the cooperation of the CDFG and the Santa Catalina Island Conservancy (SCIC), initiated a program to reintroduce bald eagles to Catalina Island. Between 1980 and 1986, 33 eagles from wild nests were raised on three different artificial nest or hacking platforms on Catalina Island (Garcelon 1988). Once the birds were able to fly (at around 12 weeks of age) they were released. Some of these birds matured and formed breeding pairs on the island. The first eggs were laid in 1987. Unfortunately they broke soon after they were laid. Subsequent contaminant analysis of egg remains revealed DDE (a metabolite of DDT) levels sufficient to cause complete reproductive failure (Garcelon et al. 1989). During 1991-93, IWS studied food habits of the released eagles and documented high levels of DDE in the tissues of certain prey items commonly consumed by these eagles (Garcelon 1997, Garcelon et al. 1997a, b).

Since 1989, the reintroduced population has been maintained through manipulations of eggs and chicks at each nest site and through hacking of additional birds. Because of the high DDE concentrations in the eggs, this active program of manipulation and augmentation is necessary to maintain the Catalina Island bald eagle population at this time.

In the egg manipulation process, structurally deficient eggs laid by the birds affected by DDE are replaced with artificial eggs. The adult eagles continue to incubate the artificial eggs while the real eggs are removed and artificially incubated at the Avian Conservation Center (ACC) at the San Francisco Zoo. Chicks that hatch from these removed eggs, or those produced by captive adults at the ACC or by wild birds, are then fostered back into the nests.

As part of the larger restoration effort, the MSRP Trustee Council will be considering a long-term restoration plan for the eagles on Catalina Island. The Feasibility Study described in this document is proposed to generate information to assist in selecting the best restoration approaches for the long term restoration plan.

PROPOSED ACTION

The proposed action and the environmentally preferred alternative, is an approximate five-year study to determine the feasibility of successfully reestablishing a breeding population of bald eagles on the northern Channel Islands given the continued presence of contamination by DDTs and PCBs.

This FS will primarily consist of the following actions:

1. Releasing captive-bred or translocated wild nestling bald eagles on Santa Cruz Island using previously developed techniques.

2. Monitoring contaminants in the released birds, their eggs and their food to determine if concentrations of DDTs are present which may impact the ability of the eagles to successfully reproduce.

The results of the FS will be used by the MSRP Trustee Council to evaluate whether to proceed with a full-scale program to reintroduce bald eagles to the northern Channel Islands.

Section 2 Affected Environment

Location and Description of the Study Area

California's eight Channel Islands (Fig. 1) are located off the coast of southern California. The four northern islands are located in the Santa Barbara Channel parallel to the coast south of Point Conception; the four southern islands are scattered offshore between Los Angeles and the Mexican border. The five northernmost islands (Santa Barbara, Anacapa, Santa Cruz, Santa Rosa, and San Miguel) and the surrounding one nautical mile of water comprise Channel Islands National Park.

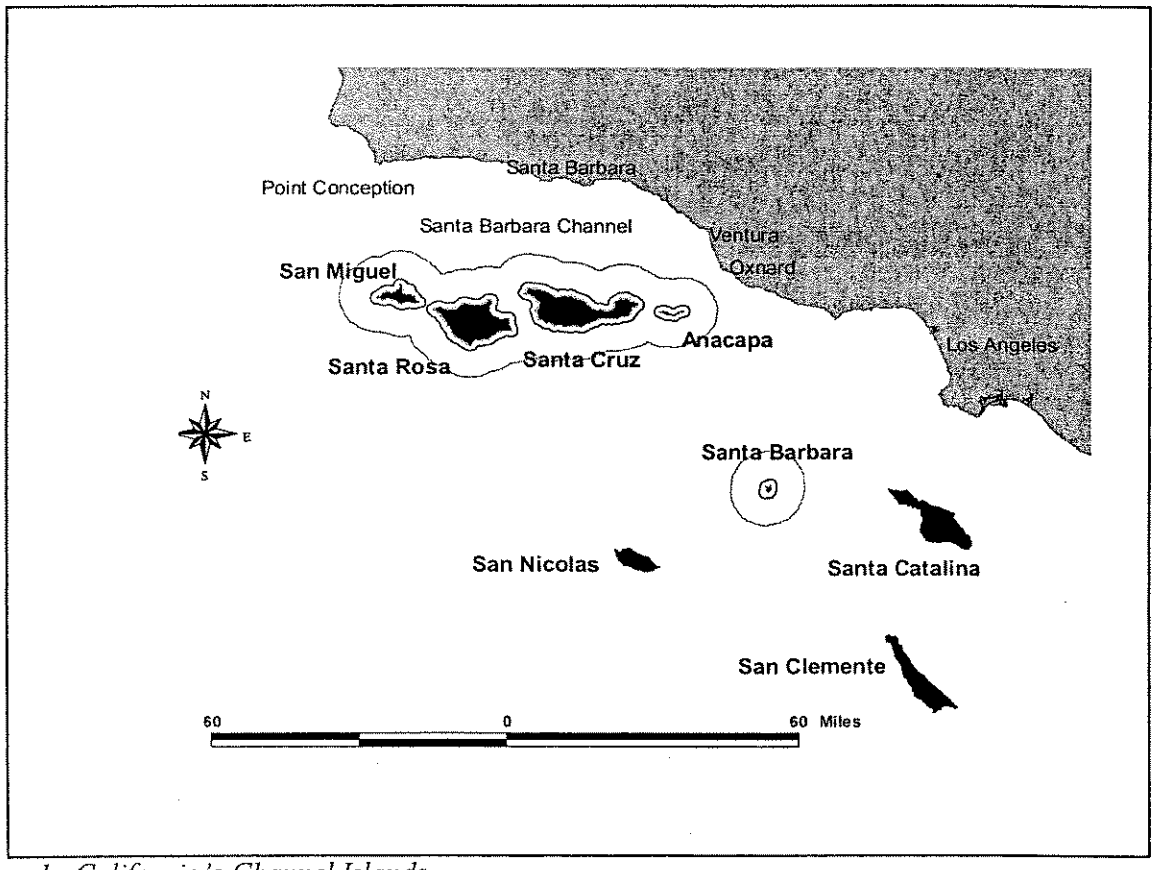

Figure 1. California's Channel Islands

The largest of the Channel Islands, Santa Cruz, is proposed as the location for reintroduction of juvenile bald eagles to the northern Channel Islands. Therefore, this document will focus in greater detail on Santa Cruz Island than on the other three northern islands. The eastern 15,000 acres of Santa Cruz Island, including the area known as the "isthmus" and "east end", is owned by the NPS.

The Nature Conservancy (TNC) owns the remaining three-quarters of the island (Fig. 2). The Nature Conservancy has indicated that it is "...very eager to see bald eagles returned to Santa Cruz Island to take

up their important place in the ecosystem, and to resume territorial behavior and thus prevent new immigration of golden eagles from the mainland." (TNC letter, August 2001).

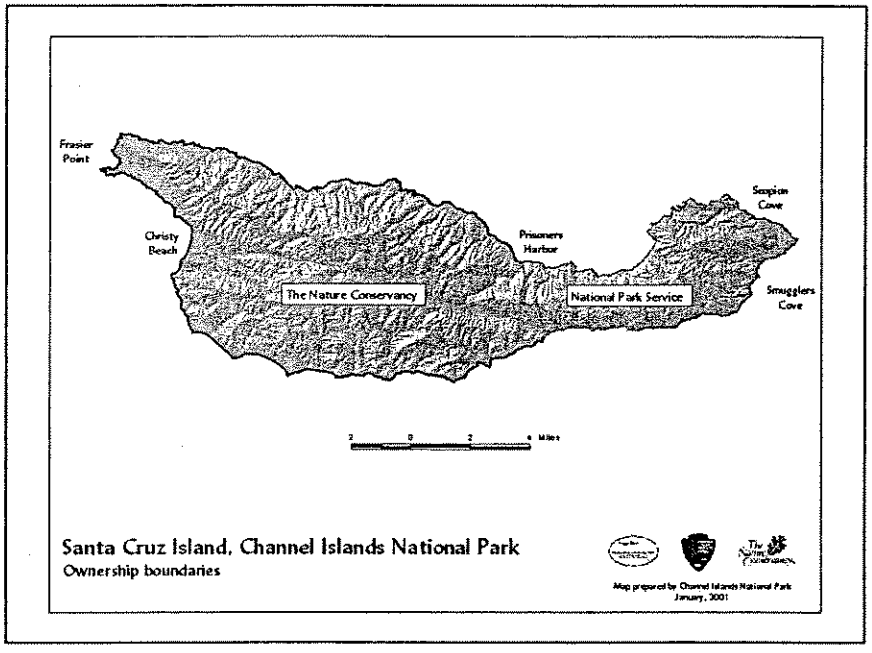

Figure 2. Santa Cruz Island and land ownership

The island's coastline includes a variety of exposures, from protected coves and sandy beaches to vertical cliff faces, hidden sea caves, and dissected marine terraces. Offshore, warm southern waters mingle with cold currents from the north, creating a significant, productive transition zone for marine life.

The diversity of the island's topography and microclimates have given rise to a variety of habitats, from rocky intertidal to chaparral to pine forests. The island's biota includes many organisms endemic to the Channel Islands, and some found only on Santa Cruz Island. Some groups, such as terrestrial vertebrates, are decidedly reduced in numbers, and certain organisms, lacking the usual competitors or predators, have taken on different forms or have invaded niches unavailable to them on the mainland. The island's seclusion, ruggedness, and history of conscientious private stewardship have protected the island from many of the usual impacts of heavy exploitation following European contact.

Aboriginal people, who traveled extensively between the mainland and the islands, may have introduced other organisms to the island. Santa Cruz Island's abundant, well-preserved archaeological sites provide insight into past cultures and environmental conditions. A later period of ranching is well represented in the many structures remaining from that period.

Introduced plants and animals have greatly impacted the environment of Santa Cruz Island. Between 1,000 and 5,000 feral pigs currently inhabit Santa Cruz Island, and have had pervasive and insidious effects on island resources. Pigs are one of the primary threats to the endangered plant species on the island, and are indirectly responsible for the recent decline of island foxes on the northern Channel Islands (Roemer 1999, Coonan 2001). The NPS and TNC are currently planning a large-scale effort to eradicate the feral pigs, and greatly reduce stands of alien fennel (NPS 2001). TNC removed over 37,000

sheep from Santa Cruz Island from 1981-1989, and the NPS removed the final 9,000 sheep from the eastern end of the island between 1997 and 2001.

The Channel Islands have a Mediterranean climate typical of the central California coast. The bulk of the annual precipitation falls from November to March, but rain is scarce from late May to October, when a stable Pacific high-pressure system settles off the coast. A shallow coastal marine layer helps lessen the impact of the common summer drought conditions on the islands. The Channel Islands are subject to periodic cycles of drought and torrential rains brought about by the El Niño/southern oscillation phenomenon.

FEDERAL CONSERVATION UNITS

This project is proposed to occur within two federally designated conservation units: Channel Islands National Park (CINP) and Channel Islands National Marine Sanctuary (CINMS). Carrying out the proposed action would further the purposes for which Congress set aside both of these areas. Channel Islands National Park, administered by the National Park Service, was set aside to protect the nationally significant wildlife and ecological values of the five park islands and surrounding marine waters. Restoration of native ecosystems, through removal of non-native species and reintroduction or enhancement of native species is a significant focus of park staff effort. The proposed action will not result in impairment of park resources.

Channel Islands National Marine Sanctuary, administered by the National Oceanic and Atmospheric Administration, is to maintain, restore, and enhance living resources by providing places for species that depend upon marine ecosystems to survive and propagate. The proposed action will not impair any sanctuary resources.

THREATENED OR ENDANGERED SPECIES

Table 1 (following page) lists all federally listed threatened or endangered species that are known to occur in or near the project area.

Table 2. Distribution and abundance of pinnipeds (seals and sea lions) on the northern Channel Islands (data from Koski et al. 1998).

	Status[1]	Anacapa Island	Santa Cruz Island	Santa Rosa Island	San Miguel Island
Northern fur seal *Callorhinus ursinus*	-	-	-	-	B
Northern elephant seal *Mirounga angustirostris*	-	H[2]	H	B	B
California sea lion *Zalophus californianus*	-	H	H	H	B
Harbor seal *Phoca vitulina*	-	B	B	B	B
Steller sea lion *Eumetopias jubatus*	FT	-	-	-	FP
Guadalupe fur seal *Arctostephalus townsendii*	FT, ST FP	-	-	-	H

[1]F = Federal, S = State, E = Endangered, T = Threatened, FP = California Department of Fish and Game – Fully Protected [2]B = Breeding, H = Haulout, FP = Formerly Present

Seabirds

Seabirds comprise the great majority of the avifauna (43 species) that uses the southern California bight (Baird 1993). Eleven species nest on the Channel Islands, eight of them on Santa Cruz Island (Table 3). The Channel Islands are especially important habitat for seabirds, due to the islands' lack of development compared to the adjacent mainland, the lack of predators, and the rich marine environment. As important as the islands are for seabirds, current numbers are less than historic numbers because of the introduction of alien predators (rats and cats) and grazers, past egg collecting, past military use of the islands, and effects of overfishing on food resources (Baird 1993). Three species, the California brown pelican, double-crested cormorant, and Brandt's cormorant, declined because of effects of organochlorine pesticides on egg thickness.

Several seabird species have either special legal status or are species of concern (Table 2). The California subspecies of the brown pelican was classified as endangered under the Federal Endangered Species Act in 1970, and was designated as endangered by the State of California in 1971. On the West coast of North America, pelican breeding colonies are located on West Anacapa Island, on Santa Barbara Island and on islands off the coast of Baja California. Pelicans also historically bred in other areas, such as on Scorpion Rock off Santa Cruz Island and East Anacapa Island. These colonies almost disappeared in the 1970's, due to egg-shell thinning caused by organochlorine pesticides in the environment (Carter et al. 1992). In 1970, only one chick successfully fledged (Anderson and Gress 1983).

The pelican breeding colonies have subsequently recovered. The number of birds in the breeding colony at West Anacapa Island has steadily increased to between 4,000 and 6,000 nests per year. This is in sharp contrast to the early 1970's in which there were only about 100 nests per year. On Santa Barbara Island, the once ephemeral colony produces 400-700 nests every year. Breeding populations in the SCB have improved since 1970, largely due to increased breeding effort (increased numbers of birds and recruitment from outside the SCB) and increased fledging rates (which are associated with the abundance of northern anchovies). However, productivity remains low in comparison to other colonies (Gress 1997, Anderson and Gress 1983).

The double-crested cormorant has been designated a species of concern by the California Department of Fish and Game. Both double-crested and Brandt's cormorants are thought to be in decline over a large portion of their range due to habitat destruction, human disturbance, and DDE thinning of eggshells (Baird 1993), although both species have increased in numbers at the Channel Islands (Carter et al. 1992). Double-crested cormorants do not nest on Santa Cruz Island, but there are approximately 400 nests annually at nearby West Anacapa Island. There are several small breeding colonies (<100 nests) on San Miguel, as well as large colonies (>1,000 nests) at Fraser Point and Gull Island (Carter et al. 1992).

The entire California breeding populations of black storm-petrels nest on the Channel Islands, as do the entire southern California populations of ashy and leach's storm-petrels (Baird 1993). About 40% of the state's breeding population of ashy storm-petrels breed on the Channel Islands. Large colonies occur at Prince Island (off San Miguel) and at Santa Barbara Island; a breeding colony of over 100 is located at Scorpion Rock, Santa Cruz Island. The planned eradication of rats from Anacapa Island, in progress, should greatly improve conditions for ashy storm-petrels on that island. Ashy storm-petrels are a California Species of Concern, on the Audubon Watch List, and the worldwide population is thought be around 10,000 breeders.

Cassin's auklets and Xantus's murrelets are crevice-nesting seabirds. Two very large colonies (>2,000 and >8,000 birds, respectively) of cassin's auklets occur on Prince Island and Castle Rock, off San Miguel Island. A breeding colony of over 300 cassin's auklets is located at Scorpion Rock (Carter et al. 1992). However recent unpublished work in 200-2001 has shown that the Scorpion Rock colony is now much smaller, possibly due to either prey changes or impacts from increased predation by owls or gulls due to squid-light boat activities (Harry Carter, personal communication). Xantus's murrelets nest in both southern California and in Mexico. Thousands of murrelets are thought to breed on Santa Barbara Island, and hundreds are thought to breed on Anacapa, San Miguel and Santa Cruz Islands (Harry Carter personal communication). Populations on Santa Barbara Island are thought to have declined in recent years (Paige Martin, personal communication). The ongoing eradication of rats from Anacapa Island should greatly improve conditions for Xantus's murrelets on that island. Xantus's murrelets are a California Species of Concern and on the Audubon Watch List.

Approximately 25,000 to 50,000 western gulls occur in the southern California bight (Baird 1993). The western gull is the only gull species that breeds in the southern California bight, and Carter et al. (1992) estimated the breeding population on the Channel Islands to be about 20,000 birds. Other gull species that occur on the Channel Islands but do not breed there include glaucous-winged gulls (*Larus glaucescens*), ring-billed gulls (*Larus delawarensis*), herring gulls (*Larus argentatus*), and Heermann's gulls (*Larus heermanni*).

Shorebirds

The Pacific coast population of the western snowy plover is federally listed as threatened. Western snowy plovers breed above the mean high tide line on coastal beaches, dunes, estuaries and lagoons from Washington to Baja California, and winter in coastal areas from southern Washington to Central America. Western Snowy plovers

In southern California, snowy plovers are primarily found on San Miguel, Santa Rosa, and San Nicolas Islands, as well as in San Diego County and on Vandenburg Air Force Base in Santa Barbara County (Baird 1993). Snowy plovers are known to breed on Santa Cruz Island but have never been observed in high numbers there. Counts of snowy plovers at Channel Islands National Park have declined since

1991(Figure 3). This decline in the park breeding population occurred concurrently with a decline in the breeding population in southern California.

Table 3. Seabird species nesting on the northern Channel Islands (data from Baird 1993; P. Martin, National Park Service, personal communication.). X Indicates breeding.

	Status[1]	Anacapa Island	Santa Cruz Island	Santa Rosa Island	San Miguel Island
Storm-Petrels					
Ashy Storm-Petrel *Oceanodroma homochroa*	CSC	?	X	-	X
Black Storm-Petrel *O. meliana*	CSC	-	-	-	-
Leach's Storm-Petrel *O. leucorhoa*		-	-	-	X
Cormorants					
Brandt's Cormorants *Phalacrocrax penicillatus*		X	X	X	X
Double-Crested Cormorant *P. auritus*	CSC	X	-	-	X
Pelagic Cormorant *P. pelagicus*		X	X	X	X
Pelicans					
California Brown Pelican *Pelicanus occidentalis californicus*	FE, SE FP	X			X
Gulls					
Western Gull *Larus occidentalis*		X	X	X	X
Alcids					
Cassin's Auklet *Ptychoramphus aleuticus*		-	X	-	X
Pigeon Guillemot *Cepphus columba*		X	X	X	X
Xantus's Murrelet *Synthliboramphus hypoleuca*	CSC	X	X	-	X

[1]F = Federal, S = State, E = Endangered, T = Threatened, FP = California Department of Fish and Game – Fully Protected, CSC = California Species of Special Concern

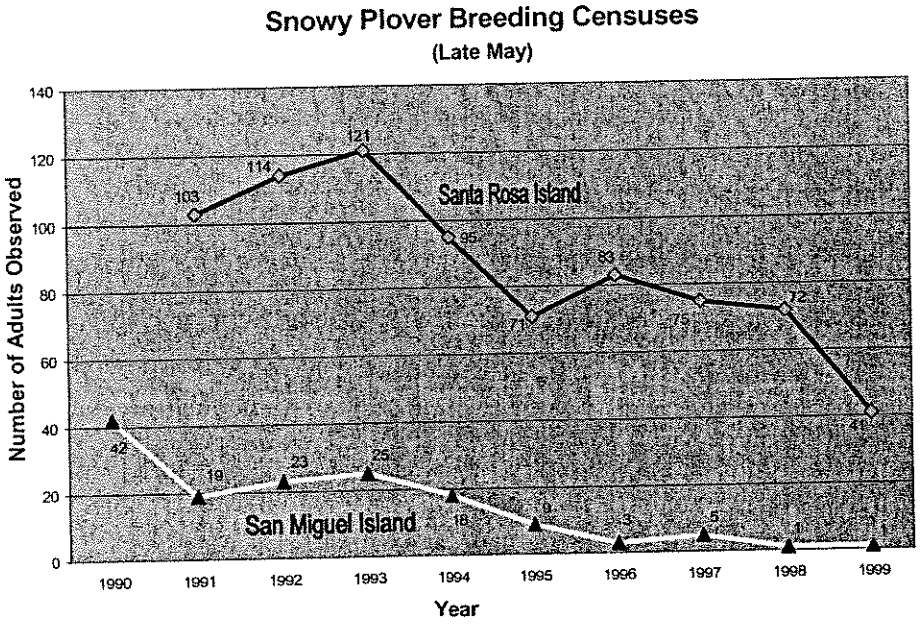

Figure 3. Spring counts of western Snowy plover adults (unpublished data, Channel Islands National Park).

COASTAL ENVIRONMENT

The Santa Cruz Island shoreline is a mixture of sand beaches and rocky benches and cliffs. The north side of the island is mostly steep rocky bluffs plunging straight into the water with intermittent small sandy pocket beaches. These beaches tend not to accumulate debris or animal carcasses. Along the south side of the island, long stretches of sand beach are more common. In the late 1990's, at least two whale carcasses washed ashore, one at the west end (Johnson's Beach) and one to the east (near Sandstone Point). Harbor seals commonly use the beaches of Santa Cruz Island but sea lions are found there only in small groups at isolated locations.

Santa Rosa Island and San Miguel Island to the west both have a higher proportion of sandy to rocky shoreline and both have several broad sandy beaches that accumulate debris and dead animals. Based on marine debris surveys between 1989 and 1993 (Cole 1998, Richards 1993), four beaches on Santa Rosa combined had an average of four pinniped and eight seabird carcasses per quarterly sample. San Miguel Island, with two beaches in the study, averaged four seabird and almost ten pinniped carcasses per sample. In that study beaches with a northwest exposure accumulated the most animal remains as well as plastic debris. Beaches with a south exposure were often swept clean, but occasionally would catch large amounts of debris and animal carcasses. Both harbor seals and elephant seals use the western and southern beaches of both islands. Sea lions and fur seals utilize San Miguel Island beaches, particularly for breeding in the spring and summer months.

TERRESTRIAL ENVIRONMENT

This section provides a description of the terrestrial component of the northern Channel Islands, with an emphasis on Santa Cruz Island, and the resources that would potentially be affected by implementation of a bald eagle feasibility study. This is not a complete description of the entire terrestrial environment; rather it is a description of the significant conditions and trends of resources that may be affected by the proposed project or its alternatives.

Vegetation

The vegetation on Santa Cruz Island is determined by the island's topographic and geologic factors. The underlying geology of the island is dominated by Santa Cruz Island volcanics overlain with eroded Pleistocene terrace deposits. The headlands on eastern Santa Cruz Island rise abruptly out of the ocean and are dominated by steep cliffs, covered by coastal bluff scrub. Away from the cliffs the topography flattens out and annual grasslands dominate the coastal terraces. As one moves towards the isthmus, which links eastern Santa Cruz Island with the main portion of Santa Cruz Island, the topography becomes quite steep and patches of island chaparral, oak woodland, and ironwood groves occur. Originating from these steep slopes are riparian canyons that have cut through the coastal terraces as they drain to the sea. On the isthmus most of the bedrock is composed of cherts and diatom-rich shales from the Monterey Formation. This material erodes readily into a reddish, clay-like soil. Island chaparral and oak woodland are the dominant vegetation communities on the isthmus. The rest of Santa Cruz Island is characterized by a large central valley, which extends diagonally down the main part of the island. The valley is bordered by gentle to steep slopes to the north and south. This topography is overlain with a mosaic of plant communities.

Junak et al. (1995) describes 16 vegetation communities on Santa Cruz Island: 1) southern beach and dune, 2) valley and foothill grassland, 3) coastal-bluff scrub, 4) coastal-sage scrub, 5) coyote-brush scrub, 6) island chaparral, 7) island woodland, 8) southern coastal oak woodland, 9) Bishop pine forest, 10) intertidal and subtidal marine community, 11) coastal marsh and estuary, 12) freshwater seeps and springs, 13) vernal ponds, 14) riparian herbaceous vegetation, 15) mule-fat scrub, and 16) southern riparian woodland.

There are nine plant species that are federally listed as "threatened" or "endangered" on Santa Cruz Island: *Dudleya nesiotica*, *Malacothrix indecora*, *Malacothamnus fasciculatus* ssp. *nesioticus*, *Helianthemum greenei*, *Galium buxifolium*, *Thysanocarpus conchuliferus*, *Arabis hoffmannii*, *Malacothrix squalida*, and *Berberis pinnata* var. *insularis*. The federal listing proposal for these species identified feral pigs as a major cause of decline for each of the plant species. The primary cause of impact to these rare species by feral pigs are rooting, direct feeding, and soil erosion.

Fauna

Santa Cruz Island harbors fewer species than comparable mainland areas, because only a subset of the mainland species successfully reached and colonized the island. This is typical of island faunas. On the other hand, evolution of island forms in relative isolation from their mainland ancestors has resulted in a high degree of endemism in the fauna of Santa Cruz Island, and for the fauna of islands as a whole. Endemic taxa (species or subspecies) are those that are restricted to a particular geographic locale.

Non-avian Vertebrates

Eight species of reptiles and amphibians have been recorded for Santa Cruz Island (Table 4), of which three are endemic to the island or archipelago. One reptile, the Santa Cruz gopher snake, occurs only on Santa Cruz and Santa Rosa Islands. Thirteen species of mammals, including nine species of bats, have

been recorded on Santa Cruz (Table 4). Three of the four non-bat mammals occur only on Santa Cruz, and the other (the island spotted skunk) occurs only on Santa Cruz and Santa Rosa Islands.

Table 4. Non-avian vertebrates of Santa Cruz Island.

Common Name	Scientific Name[1]	Legal Status[2]	Endemic Status
AMPHIBIANS			
Blackbelly slender salamander	*Batrachoseps nigriventris*	-	-
Channel Islands slender salamander	*B. pacificus pacificus*	FSC	Channel Islands
Pacific tree frog	*Pseudacris regilla*	-	-
REPTILES			
Southern alligator lizard	*Elgaria multicarinata*	-	-
Island fence lizard	*Sceloporus occidentalis beckii*	-	Channel Islands
Side-blotched lizard	*Uta stansburnia*	-	-
Santa Cruz gopher snake	*Pituophis catenifer pumilus*	FSC, CSC	SCI, SRI
Western yellowbelly racer	*Coluber constrictor mormon*	-	-
MAMMALS			
California myotis	*Myotis californicus caurinus*	-	-
Big-eared myotis	*M. evotis*	FSC	
Fringed myotis	*M. thysanodes*	FSC	
Townsend's western big-eared bat	*Corynorhinus townsendii townsendii*	FSC, CSC	
Big brown bat	*Eptesicus fuscus*	-	-
Pallid bat	*Antrozous pallidus pacificus*	CSC	
Silver-haired bat	*Lasionycteris noctivagans*	-	-
Hoary bat	*Lasiurus cinereus*	-	-
Red bat	*L.borealis*	-	-
Mexican free-tailed bat	*Tadarida brasiliensis*	-	-
Western mastiff bat	*Eumops perotis californicus*	FSC, CSC	-
Santa Cruz Island deer mouse	*Peromyscus maniculatus santacruzae*	-	SCI
Santa Cruz Island harvest mouse	*Reithrodontomys megalotis santacruzae*	FSC, PE	SCI
Santa Cruz Island fox	*Urocyon littoralis santacruzae*	ST, PE	SCI
Island spotted skunk	*Spilogale gracilis amphiala*	FSC, CSC	SCI, SRI

[1]Nomenclature for reptiles and amphibians is from Collins (1990).
[2]FSC = Federal Species of Special Concern; CSC = California Species of Special Concern; ST = State-listed as Threatened, PE = Proposed Endangered. Data on legal status is from California Department of Fish and Game (1998).

Because of their unique taxonomic status and uncertain population status, the spotted skunk and island fox are treated in greater detail.

Island Spotted Skunk

Island spotted skunks occur only on Santa Cruz and Santa Rosa Islands, having been extirpated from San Miguel Island (Walker 1980). Very little is known about the ecology of the Channel Islands spotted skunk. Difficulty in trapping skunks has plagued the few investigations that have been attempted. Crooks (1994) studied the comparative ecology of the spotted skunk on Santa Cruz Island in relation to the island fox. He found that skunks were rare and difficult to capture; that they were habitat specialists, preferring ravines, and to a lesser extent, chaparral-grasslands; and that they were entirely carnivorous and nocturnal. Crooks concluded that the low population size and relatively narrow geographic range of the skunk made the species vulnerable to extinction.

The State of California and the National Park Service list the skunk as a "Species of Special Concern". According to von Bloeker (1967), spotted skunks were once very common on Santa Cruz and Santa Rosa Islands, but by 1967 they were rarely found on either island, at least near human dwellings. The apparent rarity of spotted skunks may reflect normal population fluctuations, or it may reflect a real decline in numbers (Williams 1986).

Recent observations from Santa Cruz Island and Santa Rosa Island indicate that island spotted skunks have increased in numbers, at the same time that island foxes have decreased (T. Coonan, NPS, unpublished data; Crooks and Van Vuren 2000; D. Garcelon, Institute for Wildlife Studies, unpublished data; Roemer 1999).

Island Fox

The island fox (*Urocyon littoralis*), a diminutive relative of the gray fox (*U. cinereoargenteus*), is endemic to the California Channel Islands. It occurs on six islands with each island population varying in size from less than a hundred to a few thousand individuals. The fox exists as a different subspecies on each of the six islands, a distinction upheld by morphological and genetic work (Wayne et al. 1991, Collins 1993). The subspecies on Santa Cruz Island is *U. l. santacruzae*. Due, in part, to its limited distribution and small numbers it has been listed as a threatened species in California (California Department of Fish and Game 1987). The San Miguel, Santa Cruz, Santa Rosa, and Santa Catalina Island subspecies of the Island fox have recently been proposed for listed as a federally endangered species (Federal Register December 10, 2001). A substantial amount is known about this species' population ecology and evolutionary history due to recent work on island fox genetic variability (Gilbert et al. 1990), evolution (Wayne et al. 1991), disease incidence (Garcelon et al. 1992), and population status and conservation (Roemer et al. 1994, Roemer 1999).

Channel Islands National Park encompasses five of the eight California Channel Islands and includes three islands that harbor different island fox subspecies. Island foxes occur in virtually every habitat on the Channel Islands and feed on a wide variety of prey (Moore and Collins 1995). They occur in valley and foothill grasslands, southern coastal dune, coastal bluff, coastal sage scrub, maritime cactus scrub, island chaparral, southern coastal oak woodland, southern riparian woodland, Bishop and Torrey pine forests, and coastal marsh habitat types. Island fox home range size varies by habitat type, season and sex of the animal (Fausett 1982, Laughrin 1977, Crooks and Van Vuren 1995, Thompson et al. 1988, Roemer 1999). The island fox diet includes a wide variety of plant and animal materials (Collins 1980; Laughrin 1973, 1977, Crooks and VanVuren 1995; Moore and Collins 1995). Island foxes forage opportunistically on any food items encountered within their home range. Selection of food items is determined largely by availability, which varies by habitat and island, as well as seasonally and annually. Principal foods eaten include mice, ground nesting birds, arthropods, and fruits.

Island fox populations on Santa Cruz and San Miguel Islands have been annually monitored since 1993. The island fox population on San Miguel declined beginning in 1994 (Coonan et al. 1998) with the adult population falling from 450 in 1994 to 15 in 1999. The Santa Cruz population declined from approximately 2000 adults in 1994 to approximately 70 in 2001 (Coonan personal communication.) Survey data from Santa Rosa Island (G. Roemer, New Mexico State University, unpublished data) indicate that island foxes are underwent similar catastrophic declines on that island as well, and decreased from over 1,300 in 1994 to 22 in 2000 (Coonan 2001, Roemer et al. 1995).

Predation by non-native golden eagles (*Aquila chrysaetos*) is the primary mortality factor now acting upon island foxes on the northern Channel Islands, and is likely responsible for the massive decline of the past five years (Roemer 1999). Golden eagle predation was identified as the cause of death for 19 of 21 island fox carcasses found on Santa Cruz Island from 1993 to 1995. On San Miguel Island in 1998-1999, four of eight radiocollared island foxes were killed by golden eagles in a four-month period, and another two died of unknown causes (Coonan unpublished data). This level of golden eagle predation is unnatural. Until recently, golden eagles did not breed on the Channel Islands and their recent appearance is due to a prey base, feral pigs, that was not present prehistorically.

The absence of bald eagles, which bred historically on the islands and whose presence may have kept golden eagles away, is another factor contributing to island fox decline. Moreover, on much of the northern Channel Islands, historic sheep grazing changed the predominant vegetation from shrub to non-native grasslands, which offer much less cover from aerial predators.

Concerned about the potential loss of three subspecies of island foxes from its lands, the park has worked with experts since April 1999 to consider the available information and develop strategies to recover island fox populations to viable levels. The experts recommended that the NPS implement the following emergency measures to safeguard island foxes and to recover fox populations on the northern Channel Islands:

- Relocate golden eagles from the northern Channel Islands
- Establish fox sanctuary/captive breeding programs on Santa Rosa and San Miguel Islands
- Eradicate feral pigs
- Reintroduce bald eagles

The NPS, TNC, USFWS and other partners are currently operating programs to capture and relocate golden eagles and captive breed foxes on San Miguel and Santa Rosa Islands. Captive breeding for island foxes on Santa Cruz Island is beginning in 2002. As of fall, 2001, 19 golden eagles had been removed from Santa Cruz Island, and four remained on the island (Latta personal communication.). Golden eagles will likely disperse from the mainland and winter and attempt to breed on Santa Cruz Island until feral pigs, their primary prey base, have been removed.

Feral Pigs

Feral or domestic pigs are not native to North America. Domestic pigs were brought to California by Spanish settlers in 1769 (Barrett 1999) and were introduced to Santa Cruz Island in 1852 (Schuyler 1988). By 1857 pigs had escaped and become feral on Santa Cruz Island. Feral pigs are found in all locations and habitat types on Santa Cruz Island (Schuyler 1988). Reasonable pig population estimates for Santa Cruz Island were not available until the 1980's, although it is generally accepted that the removal of feral sheep from the island increased both vegetative cover and the carrying capacity for feral pigs (Babbler 1982, Sterner 1990). Annual estimates of the island's pig population have ranged from 1,000 to 5,000. The pig

population fluctuates greatly from year to year because of the influence of climate, as well as the vast reproductive potential of pigs.

Feral pigs are a primary threat to natural and cultural resources on Santa Cruz Island, due to their impacts on vegetation, threatened and endangered plants, indirect effects on island foxes, and direct impacts to archeological sites. In collaboration with The Nature Conservancy, the park has begun planning for removal of pigs from Santa Cruz Island (NPS 2001). The effort is likely to take six to eight years to complete.

Landbirds

Forty-four species of landbirds are known to breed on Santa Cruz Island (Table 5) (Diamond and Jones 1980). Nine of those taxa are subspecies endemic to two or more of the Channel Islands, while one, the island scrub-jay, is a species endemic to Santa Cruz Island. Three of the endemics (horned lark, rufous-crowned sparrow, and loggerhead shrike) exist at low population levels (H. Walter, University of California, Los Angeles, unpubl. data). Several pairs of peregrine falcons, a species formerly listed as endangered, breed annually on the island.

As mentioned above, golden eagles now breed, or attempt to breed, on Santa Cruz Island, although they were never known to breed there historically. One pair bred successfully above Coche Point in 1999; three pairs began breeding in 2000 but never produced eggs, and three pairs attempted breeding in 2001, one of those pairs producing eggs and young (Latta personal communication.). The three pairs that failed to breed in 2000 were probably limited by availability of young feral pigs, which were scarce in spring, 2000 (adult feral pigs are larger than ideal size range of golden eagle prey). Conversely, piglets were plentiful in spring, 2001, and one golden eagle pair produced eggs and young.

Due to variability in the feral pig population, and general lack of terrestrial vertebrate prey, Santa Cruz Island is probably marginal habitat for golden eagles (Latta personal communication.). Many of the eagles that have been translocated from the island were in poor body condition when captured.

Table 5. Breeding landbirds of Santa Cruz Island.

Common Name[1]	Latin Name	Legal Status[2]	Endemic Status[3]
Golden eagle	*Aquila chrysaetos*	CSC, FP	-
Red-tailed hawk	*Buteo jamaicensis*	-	-
Peregrine falcon	*Falco peregrinus*	SE, FD	-
American kestrel	*Falco sparverius*	-	-
California quail	*Callipepla californica*	-	introduced
Western snowy plover	*Charadrius alexandrinus nivosus*	FT	-
Killdeer	*Charadrius vociferus*	-	-
Black oystercatcher	*Haematopus bachmani*	-	-
American oystercatcher	*Haematopus palliatus*	-	-
Mourning dove	*Zenaida macroura*	-	-
Barn owl	*Tyto alba*	-	-
Northern saw-whet owl	*Aegolius acadicus*	-	-
Burrowing owl	*Athene cunicularia*	FSC, CSC	-
White-throated swift	*Aeronautes saxatalis*	-	-
Anna's hummingbird	*Calypte anna*	-	-
Allen's hummingbird	*Selasphorus sasin sedentarius*	-	All Channel Islands
Northern flicker	*Colaptes auratus*	-	-
Pacific-slope flycatcher	*Empidonax difficilis insulicola*	-	All Channel Islands
Black phoebe	*Sayornis nigricans*	-	-
Ash-throated flycatcher	*Myiarchus cinerascens*	-	-
Horned lark	*Eremophila alpestris insularis*	-	All Channel Islands
Barn swallow	*Hirundo rustica*	-	-
Island scrub-jay	*Aphelocoma insularis*	-	Santa Cruz
Common raven	*Corvus corax*	-	-
Bushtit	*Psaltriparus minimus*	-	-
Red-breasted nuthatch	*Sitta canadensis*	-	-
Rock wren	*Salpinctes obsoletus*	-	-
Bewick's wren	*Thryomanes bewickii nesophilus*	-	Northern Channel Islands
Blue-gray gnatcatcher	*Polioptila caerulea*	-	-
American robin	*Turdus migratorius*	-	-
Northern mockingbird	*Mimus polyglottos*	-	-
Loggerhead shrike	*Lanius ludovicianus anthonyi*	-	Northern islands
European starling	*Sturnus vulgaris*	-	-
Hutton's vireo	*Vireo huttoni*	-	-
Orange-crowned warbler	*Vermivora celata sordida*	-	All Channel Islands

CULTURAL RESOURCES

Santa Cruz Island contains thousands of relatively intact archeological sites which record the almost 8,000 year occupation of the island by the Chumash, the original inhabitants of the northern Channel Islands and the southern California area from San Luis Obispo to Malibu. More than 630 archeological sites have been recorded on Santa Cruz Island with intensive surveys covering perhaps 20% of the island. The entire island probably contains about 3,000 archeological sites. The island's archeological resources were listed on the National Register in 1978 as the Santa Cruz Island Archeological District.

A period of ranching followed the Chumash occupation of the island, and the ranching history is abundantly evident in the many ranching structures that remain on the island. The long period of ranching and agriculture, which began in the mid 19th century and continued until the end of the 20th century, is reflected in the island's cultural landscape. Additionally, numerous coastal fishing and recreational camps flourished on the island around the turn of the 20th century. There are also remnants of oil exploration on the island, at least one abandoned World War II military encampment, and the remains of shipwrecks can be found on the beaches and intertidal zone and in the waters surrounding the island.

SOCIOECONOMIC

All of the park islands are open to visitation and have campgrounds for public use. Some park visitors never step onto the islands; they only visit the marine waters within the park or the park's visitor center in Ventura.

The park estimates numbers of marine visitors through counts at selected anchorages that are then extrapolated to the entire park. Direct counts are performed of "visitors ashore" (i.e., those visitors that come onto the islands). In the years 1996, 1997, and 1998, 30,472, 36,314, and 35,169 visitors, respectively, landed on the islands.

The acquisition of eastern Santa Cruz Island caused a large change in visitation patterns and total numbers for the park. Although all of Santa Cruz Island is within the boundaries of CINP, TNC owns the majority of Santa Cruz Island. The NPS currently owns the eastern 24% of the island, while TNC owns the remaining 76%.

Visitor access is different on lands owned by NPS and lands owned by TNC. In general, Santa Cruz Island lands owned by NPS are fully open to visitor access and use, whereas some lands owned by TNC are available for restricted use by the public. Eastern Santa Cruz Island has been fully open to visitor use since 1997, and has become one of the most popular visitor destinations in the park. The number of visitors to east Santa Cruz Island has increased since the Park completed acquisition of the east end in 1997. The Island Packers Company, as concessionaire, provides boat transportation to Santa Cruz Island, landing visitors at Scorpion Bay on a nearly daily basis. It also provides scheduled trips to several parts of TNC's lands. A campground has been established at Scorpion and is very popular, with heaviest use on weekends and filled to capacity on holiday weekends. Visitor activities on east Santa Cruz include hiking, beach-going, kayaking, and snorkeling. Private boaters also visit all of Santa Cruz Island. A popular hike is across east Santa Cruz from Scorpion to Smuggler's Harbor and return. Currently there is no backcountry camping on Santa Cruz Island.

Scientific research is a primary use of TNC lands on Santa Cruz Island. The University of California has operated a field station on Santa Cruz Island since 1966. Santa Cruz Island Reserve is part of the University of California Natural Reserve System. About 20 researchers carry out projects annually on

Santa Cruz Island through the UC Reserve. Additionally, numerous school classes, primarily college and high school, visit the island and stay at the UC Reserve facilities.

Section 3 Alternatives

ALTERNATIVE DEVELOPMENT PROCESS

Public Scoping

Scoping is a process the Trustees used to determine environmental issues and alternatives for this project. Scoping was performed internally (Trustee agency specialists), and externally (State and Federal agencies, interested and affected public) to determine the environmental issues and alternatives listed below.

External scoping was initiated by sending a letter that described the proposed action to the affected and interested public. The letter asked interested participants to send their comments, issues, or concerns regarding the proposed action. For this project 38 scoping letters were sent out and the Trustees received eight written comments on the project proposal.

In addition, the draft Feasibility Study/Environmental Assessment (FS/EA) was subject to a 30 day public review period. The Trustees sent out 38 copies of the draft FS/EA and received three public comments on the draft FS/EA.

Evaluation Criteria

CERCLA requires the Trustees to use the Montrose case settlement funds for restoring, replacing, rehabilitating, and/or acquiring the equivalent of natural resources injured and services lost as a result of the DDTs and PCBs at issue in the settlement agreements.

The Trustees have compiled and presented in our scoping document the following initial set of criteria for analyzing potential restoration projects for this case.

- Nexus to Injured Resources – As described above, restoration efforts of the MSRP are directed at projects that restore, rehabilitate, replace, enhance or acquire the equivalent of the resources and services impacted by the release of DDTs and PCBs.
- Feasibility - Based on past experience or studies, the restoration projects must be technically and procedurally sound.
- No Duplicate or Replacement Funding - The Trustees will not fund projects that are already going to be funded or accomplished by other means or should be funded by more appropriate sources.
- Legality - The projects must comply with all applicable laws
- Likelihood of Success – Projects will be evaluated for their potential for success, including the level of expected return of resources and resource services. Performance criteria of projects will have to be clear and measurable.

- Cost Effectiveness – The projects will be evaluated by considering the relationship of expected project costs to the expected resource/service benefits from each project alternative.

- Multiple Resource Benefits – Benefits can be increased if proposed projects benefit more than one natural resource or resource service.

- Duration of Benefits – As described previously, contamination by DDTs and PCBs is expected to continue for decades. Long-term benefits are the objective of these projects, and the Trustees will evaluate project alternatives according to their expected duration of benefits.

- Public Health and Safety – Possibility that a proposed alternative would create a threat to the health and safety of the public will be part of the evaluation process.

- Likelihood of Adverse Impacts – Evaluation of projects will include examination of potential adverse impacts on the environment and the associated natural resources.

- Opportunities for Collaboration – Cost effectiveness can be enhanced by matching funds, in-kind services, or volunteer assistance as well as coordination with on-going or proposed projects.

The specific objective of this FS/EA is to determine the feasibility of recolonizing the northern Channel Islands with bald eagles given the continued presence of DDT contamination in the food web of the southern California bight to inform the development of broader restoration of eagles to the Channel Islands in the comprehensive restoration plan. Alternatives presented in this FS/EA will be evaluated against the criteria presented above and the ability of the alternative to fulfill the objective of the FS/EA.

ALTERNATIVE A: NO ACTION

Under this alternative, the Trustees would take no direct action to restore injured natural resources or compensate for lost services pending natural recovery. Instead, the Trustees would rely on natural processes for recovery of the injured natural resources, specifically bald eagles re-populating the northern Channel Islands. While natural recovery of bald eagles to the northern islands might occur over time, there would be continuing injury to the ecosystem.

The principal advantages of this approach are the ease of implementation and the absence of monetary costs because natural processes rather than humans determine the trajectory of recovery.

ALTERNATIVE B: PROPOSED ACTION

The Proposed Action is a study to determine the feasibility of reestablishing bald eagles on the northern Channel Islands. The information from the Feasibility Study would be used to inform the MSRP Trustees and the public regarding the potential for restoration of bald eagles to the northern Channel Islands.

Bald eagles have not naturally reestablished a breeding population on the northern Channel Islands. In searching for new territories, bald eagles key in on the presence of other eagles. Reintroduced eagles on northern Channel Islands would act as an indicator of suitable habitat, and for this reason, intervention to

establish bald eagles on the northern Channel Islands may be necessary to bring this species back to the area.

Feasibility Study Methods

Santa Cruz Island has been chosen as a release site because historically it had a large population of nesting bald eagles, and the habitat is largely unchanged since the time that eagles bred there. Additionally, the existing feral pig (*Sus scrofa*) population on the island could be a ready source of contaminant-free carrion for supplemental feeding of released eagles.

Twelve eagles will be released annually on the island over a five-year period. Bald eagles reintroduced to the northern Channel Islands will be obtained from a captive breeding facility. If captive birds are not available birds will be obtained from a wild population robust enough to accommodate removal of offspring without consequences to the wild population. The San Francisco Zoo's captive breeding program is a likely source of eagles for reintroduction. Possible locations for removing bald eagles from the wild include Washington, British Columbia and Alaska.

Nestling eagles obtained for release will be reared and released from two hack-towers to be constructed on Santa Cruz Island. Each hack-tower site will be chosen to meet the criteria of easy access by project personnel (road access at or near the site), suitable adjacent perching sites, a reasonable view of the surrounding area, and the ability to control access to the site by visitors. Locations for the release sites will be selected in consultation with the National Park Service and The Nature Conservancy so as to have minimal impact on their operations, while providing a location that meets the above criteria.

Each of the two hack towers will have two boxes, and each box will hold three nestling eagles. The two towers will be placed at separate locations to reduce aggressive interactions among released birds and to prevent loss of all birds in the case of local catastrophic event (fire, storm, etc.).

A ladder located at the back of each hack tower will allow access by project staff to a blind from which food can be provided to the birds through chutes. The birds can also be observed through one-way glass to monitor their development. A closed-circuit video system will be installed to allow remote monitoring of the eagles when project personnel are not in the blind. The birds will be fed a diet of marine fish and feral pig, both local food sources.

When the eagles are approximately 11 weeks old, they will be equipped with backpack-mounted telemetry transmitters, patagial wing markers, and U.S. Fish and Wildlife Service metal leg bands. The telemetry transmitters will allow personnel to track the movements of the birds for a period of up to four years. During the early post-fledging period, the transmitters will allow biologists to assist birds that may have difficulties (i.e., injuries, not finding food, etc.). Over the long term, the transmitters and markers will help all agencies involved in the project keep track of individual birds as they move either among the islands or off the islands to the mainland. Colored patagial wing markers have allowed eagles released on Santa Catalina Island to be resighted in a variety of locations in California and the Pacific Northwest (Sharpe and Garcelon 2000).

When the eagles are approximately 12 weeks old, or when they are demonstrating good motor skills in the hacking towers, the towers will be opened and the birds released. Initially, food will be left inside or on top of the towers for the birds. Later, carrion of the type the eagles would normally be expected to find after release will be placed on the ground in front of the towers. Gradually the carrion will be placed farther and farther from the towers to encourage the birds to search for prey. Approximately six weeks after fledging, the eagles generally become independent of the hack towers and the associated food and are foraging in other locations on their own (Garcelon 1988).

Bald eagles released on Santa Cruz Island may stay on the island, move to other of the Channel Islands, or disperse to the mainland after they are independent of the hacking towers. On Santa Catalina Island, most eagles released during the first few years of the reintroduction effort stayed on the island (Garcelon 1988). Released birds will be monitored year-round to understand how well the birds are adjusting to their new environment, to examine movements among the northern Channel Islands, and to examine factors that may be contributing to mortality. Having personnel on the island will also allow supplemental feeding of the released eagles by leaving carrion around the island during the winter and spring months. This continued availability of food might help keep the eagles on the island until they develop their skills to capture live fish and birds.

For an initial release in mid-summer, 2002, selection of hack tower sites and construction of the towers will be completed by mid-June 2002.

Monitoring

A plan to monitor juvenile bald eagles released to Santa Cruz Island has been developed based on the recommendations from several experts that research and monitor the effects of organochlorine contaminants in raptors and evaluate techniques for dietary foodwebs. This monitoring plan (Appendix A) will use stable isotope analysis, blood analysis, radiotelemetry, and trend analysis to evaluate the sources, exposures, and risks of DDE to eagles and the island food web. This monitoring plan is viewed as adaptive and elements of the plan may be changed based upon usefulness and feasibility of the collected data.

ALTERNATIVES THAT WILL NOT BE EVALUATED FURTHER

Monitor bald eagles on Catalina Island to determine feasibility of establishing bald eagles on the northern Channel Islands.

In this alternative, bald eagles would not be reintroduced to the northern Channel Islands. Instead, the MSRP would use the birds currently breeding on Catalina as a model to determine whether it would be possible to reestablish a breeding population of eagles on the northern Channel Islands. The trustees would study the levels of DDE in adult Catalina eagles, their eggs and their prey to determine the levels of DDE that eagles on the northern Channel Islands may be exposed to. The trustees do not propose to implement this alternative because the diet of eagles on the northern Channel Islands would likely be substantially different from the diet of eagles on Catalina Island due to the greater diversity of species present on the northern Channel Islands. Therefore, it would not be possible to determine the feasibility of establishing eagles on the northern Channel Islands by only studying the eagles on Catalina. This alternative would not allow the Trustees to fulfill their objective of determining the feasibility of recolonizing the northern Channel Islands with bald eagles given the continued presence of DDT contamination in the food web of the Southern California Bight.

Determine feasibility of reintroducing bald eagles to the northern Channel Islands by studying DDT contamination in likely eagle prey items

This alternative would involve examining the level of DDT contamination in various eagle prey items and modeling from these levels the feasibility of reintroducing bald eagles to the northern Channel Islands.

The trustees do not propose to implement this alternative because there is too much uncertainty regarding the dietary composition of eagles on the northern Channel Islands to accurately model the risk to reintroduced eagles. In 2000, the USFWS.completed an ecological risk assessment for the potential reintroduction of bald eagles to the Northern Channel Islands for the trustees. The trustees found that there was too much uncertainty regarding the components of eagle's diet to make the results of this assessment reliable. This alternative would not allow the Trustees to fulfill their objective of determining the feasibility of recolonizing the northern Channel Islands with bald eagles given the continued presence of DDT contamination in the food web of the Southern California Bight.

Section 4 Environmental Consequences

ENVIRONMENTAL ISSUES IDENTIFIED

Through the scoping process the following resource categories have been identified that the No Action or the Proposed Action alternatives may potentially affect:

Threatened/Endangered/Proposed species

Vegetation

Soils

Birds

Mammals

Fishes

Beach community

Socioeconomic

Cumulative Effects

NO ACTION ALTERNATIVE - NATURAL RECOVERY

Threatened/Endangered/Proposed species

The lack of bald eagles on the northern Channel Islands would have adverse impacts, indirectly, on the island foxes. The island fox is a listed as threatened in the State of California and is proposed for federal listing as an endangered species. Were bald eagles to breed on the northern Channel Islands, foxes would benefit if territorial bald eagles deter golden eagles from breeding, wintering or roosting on the islands. Those potential benefits would not be realized if bald eagles are not restored to the northern Channel Islands. Until feral pigs are removed (estimated to be completed by 2009-2011), golden eagles on Santa Cruz Island will continue to be supported by an abundant prey base, undeterred by bald eagles, and will prey on island foxes.

Vegetation

There would be no impact to vegetation under the No Action alternative.

Soils

There would be no impact to soils under the No Action alternative.

Birds

There would be no effects on other species, such as golden eagles, with which bald eagles may become involved in agonistic or territorial behavior. In addition, there would be no effect on seabirds, such as Xantus's murrelets, western gulls, or ashy storm-petrels.

Fishes

There would be no effects of released eagles on potential prey items or populations of potential prey items, such as marine fishes. Populations of potential prey items will continue to be affected by ecological and environmental factors already functioning in the ecosystems of the northern Channel Islands (e.g., weather/climate, food availability, etc.).

Beach community

Bald eagles will not be foraging on beaches and removing dead fish and marine mammals.

Socioeconomic

Visitors to the islands and marine waters will not have the pleasure of seeing bald eagles, a symbol of wilderness, at the islands. It is unknown how much additional visitation to the islands might occur if bald eagles were a common part of the ecosystem regularly visible to visitors. No Action will continue the unnatural situation of not having bald eagles resident and breeding at the northern Channel Islands.

PROPOSED ACTION: FEASIBILITY STUDY

Threatened/Endangered/Proposed species

This alternative will not affect the listed plant species found on Santa Cruz. In compliance with Section 7 of the Endangered Species Act, the Trustees have written the USFWS regarding our findings and request their concurrence.

The Trustees believe, for reasons listed below, that this project is unlikely to negatively affect the bald eagles, California brown pelicans, western snowy plovers, or the island fox

Bald Eagles

There are potential impacts on bald eagles from the capturing of eagles for blood analysis and other non-lethal sampling (e.g. feathers). The effects on bald eagles from this activity are likely to be insignificant because capturing techniques will be employed that have been used successfully by biologists with other bald eagle populations. The reintroduction effort at Catalina Island has resulted in a number of bald eagles being added to the west coast population of bald eagles. This feasibility study, by placing bald eagles on the northern Channel Islands, is expected to add more eagles to this population. FWS will consider potential effects to bald eagles of this feasibility study at the time they review the application for the collecting permit.

Of the 44 bald eagles fostered into nests or hacked onto Catalina Island since 1989, 6 died within the first year. This is considered to be within the normal range of eagle survival in the wild and for a reintroduction program. One adult eagle died, in all likelihood, due to DDE poisoning out of 81 eagles released on Catalina over the 20 years of reintroduction efforts (Garcelon testimony; Sharpe and Garcelon 2000). The Northern Channel Islands are not expected to be more contaminated than the Southern Channel Islands and so DDE exposure to bald eagles is not expected to be greater on the Northern Channel Islands.

California Brown Pelicans

There is no documentation of bald eagles preying on pelicans at any stage in their life history. It is possible that a hunting bald eagle could cause nesting or roosting pelicans to flush. This would likely be

a rare event (Gress 2000). Monitoring of bald eagles during the feasibility study will provide an opportunity to determine the extent of interaction between California brown pelicans and bald eagles. However, on the current evidence, it is highly unlikely that bald eagles would cause negative impacts on California brown pelicans.

Western Snowy Plovers

The pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) is listed as threatened by the US Fish and Wildlife Service (Federal Register, 1993). Western snowy plovers would be a small prey item for bald eagles, and would likely not be energetically beneficial for bald eagles to hunt them. Stalmaster (1987) indicates that bald eagles most often scavenge or steal their prey from other animals and only resort to hunting and killing prey when their preferred methods fail. Stalmaster also indicates that juvenile bald eagles, the age-class that will be released to Santa Cruz Island, are less likely to engage in hunting and killing of their prey than are adults.

The Institute of Wildlife Studies (IWS) performed an extensive literature review (24 different studies conducted in Alaska, Washington, British Columbia, Oregon Nova Scotia Missouri, Maine, Nebraska, Minnesota, Oklahoma, Florida and the Great Lakes) on the diets of bald eagles. The results of the review concluded that no shorebirds were found in the diet of bald eagles (Garcelon 1997).

In coastal areas, seabirds and other large birds comprised the largest portion of the bird prey part of the bald eagle diet. In food habit studies conducted on Catalina bald eagles between 1991 and 2000, only 3 shorebirds were documented as prey items (one surfbird, one red phalarope and one yellowlegs). All of these species are substantially larger than the western snowy plover.

Both the literature review and the studies on Catalina reflect an unlikely chance that the bald eagles residing on the northern Channel Islands would have any effect on the snowy plover. Monitoring of the introduced bald eagles during the feasibility study will ensure that this conclusion is tested.

Vegetation

Impacts to vegetation may occur at the site of the hack box structures. The hack boxes will be constructed in areas of primarily non-native vegetation and will be temporary structures. Therefore, the impacts to native vegetation of this project will be negligible.

Soils

There will be short-term, local impacts to soils at the time of construction and removal of hack box structures.

Birds

The greatest concern voiced in public comments received during the scoping period concerned the potential impact of bald eagles on seabirds, particularly on Xantus's murrelets and ashy storm-petrels. Both of these birds are species of concern that may be listed as endangered or threatened in the near future. Concern was also voiced regarding predation by bald eagles on surface nesting seabirds, such as western gulls, common murres (former breeders at Prince Islet), on the federally endangered California brown pelicans and on the three breeding species of cormorants.

Bald eagles will prey upon avian species, particularly medium to large-sized seabirds such as gulls (*Larus* spp.), grebes, and loons. None of theses seabirds are threatened or endangered species around the northern Channel Islands. Based on data collected on the food habits of bald eagles on Santa Catalina Islands, they may also occasionally take smaller bird species, either alive or as carrion (Garcelon 1997).

Bald eagles primarily prey on fish and carrion, and are therefore unlikely to have any major impact on other wildlife living on or around the Channel Islands (Sharpe personal communication.). The diet of bald eagles is likely to differ greatly according to the age of the bird (Sharpe and Garcelon, 1999). The diet of bald eagles less than two years of age would primarily consist of scavenged food and the birds would have access to food located anywhere on the island because of their lack of territoriality (Sharpe and Garcelon, 1999). If a feral animal hunting program were initiated, their diet would consist of largely feral pigs (Sharpe and Garcelon, 1999).

Bald eagles more than two years old would feed mainly on fish. Sharpe and Garcelon (1999) estimated that fish would compose 86% of their diet. This is based on diet observations of eagles on Santa Catalina Island and the assumption that the fish abundance around the northern islands is similar to that around Santa Catalina.

Avian species known to be in the diet of eagles on Catalina occur in greater numbers on the northern islands. However, an increase in the availability of these birds will not necessarily result in a proportional increase in the eagle's diet because: 1) it is energetically expensive for eagles to pursue and capture live birds (Sharpe and Garcelon, 1999), 2) pursuits of birds are usually unsuccessful (Bayer 1987, Ofelt 1975, Parrish 1995) and 3) differences in prey per unit area between Catalina and the northern islands are not likely as extreme as differences in total prey numbers because of the increased area encompassed by Santa Cruz (i.e. Santa Cruz is greater in land mass than Catalina) (Sharpe and Garcelon, 1999). Based on these factors it is estimated that the overall bird component of the eagle's diet would remain close to the 9% observed on Catalina but species composition would differ among islands (Sharpe and Garcelon, 1999).

Figure 4 shows an estimate of the different components of bald eagle diets on Santa Cruz/Anacapa Island based upon prey abundance and known diets of eagles on Catalina Island. As the graph shows, fish are the primary component of the bird's diet. Alcids, such as the Xantus's murrelet and cassin's auklets, shearwaters and cormorants are found in higher numbers on the northern islands as compared to Catalina (Carter, 1999), therefore we expect that the proportion of these species in the eagles diet would be greater than that observed on Catalina but not in proportion to the higher numbers of seabirds present on the northern islands. Sharpe and Garcelon (1999) estimated that alcids would compose 2.1% of the diet of eagles on Santa Cruz Island. At these levels, the Trustees feel that bald eagles will not have a significant impact on the populations of these birds. The diet of reintroduced eagles will be monitored to document any potential impacts.

Since bald eagles have had a long historical presence on the Channel Islands prior to their extirpation and presumably coexisted with the seabird populations there, restoration of bald eagles is not expected to have a significant impact on current seabird populations (Gress, personal communication). Sharpe and Garcelon (1999) also estimate that Brandt's and other cormorant species would comprise less than one percent of the eagles diet. This small amount is probably due to cormorants large size and diving ability both of which makes them difficult to capture.

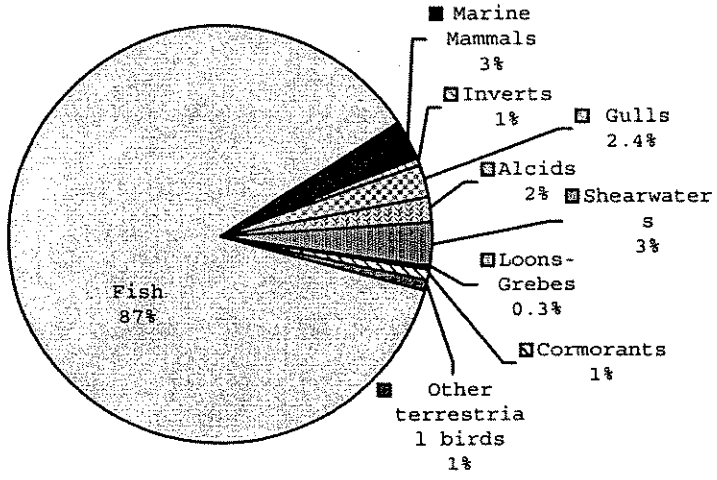

Figure 4- Predicted diet of bald eagles living on Santa Crua/Anacapa Islands based upon prey abundance and known diets of bald eagles on Santa Catalina (Sharpe and Garcelon, 1999).

Bald eagles have been known to prey on storm-petrel species in Alaska and British Columbia (Slater personal communication, Rodway et al. 1991). Storm-petrel remains have been found in regurgitated eagle pellets from the Saint Lazaria and Forrester Islands, Alaska,. Habitat, however, on these islands is different from Santa Cruz Island. These islands are heavily forested which may increase the bald eagles ability to capture petrels (Slater personal communication). Also, population studies on seabird colonies in Alaska and British Columbia were performed during the summer months when little or no night exists. Storm-petrels are nocturnal and with no night, they become easy prey.

Ashy storm-petrels have never been recorded in the diet of bald eagles on Santa Catalina over almost ten years of observing their food habits (Sharpe and Garcelon, 1999). In the 1999 report, Sharpe and Garcelon state that they do not feel that ashy storm-petrels would be other than incidental in the diet of eagles on Santa Cruz. Despite the larger number of ashy storm-petrels breeding on Santa Cruz, we do not expect this species to be a large component of the diet. This is mainly because ashy storm-petrels are nocturnal during the breeding season and nest in sea caves or other secluded areas, both of which makes them largely unavailable to eagles. In addition, ashy storm-petrels are largely pelagic in their foraging areas throughout the year. Also, ashy storm-petrels would provide very low energy benefit for eagles due to their small size when compared to the energy required to capture them (Sharpe personal communication).

It is estimated that western gulls and other gull species would comprise approximately two percent of the diet of bald eagles on Santa Cruz (Figure 4). It is unlikely that western gulls will provide a large food source because mobbing of eagles by gulls will deter eagles from nesting areas. Also, eggs would only be available for one to two months of the year (Sharpe and Garcelon, 1999).

Additional scoping comments raised concerns related to disturbance by eagles of surface-nesting seabirds. Studies on the surface-nesting common murre along the Oregon and Washington coast demonstrated impacts of eagles on these populations by flushing and thereby exposing their eggs to other bird and mammal predation.

The situation in the Channel Islands, however, is substantially different as most of the surface-nesting seabirds consist of brown pelicans, three species of cormorants and western gulls. A bald eagle soaring

close over a colony may flush roosting birds and those in loafing groups on the periphery of the colony, but it is unlikely that a nesting bird would be dislodged (Gress personal communication.). Western gulls may be more vulnerable to bald eagle predation and harassment but it is unlikely that it will cause a significant impact, such as colony abandonment or reduced breeding success (Gress personal communication). Bald eagles were part of the original bird community of the Channel Islands and historical seabird populations were not severely affected by them (Anderson personal communication). During the feasibility study, the eagles will be closely monitored to determine if disturbance to these seabirds is greater than expected.

There will likely be no impacts to seabirds from the collection of seabird eggs and adults for contaminant trend analysis as found in the monitoring plan (Appendix A). A total of no more than 50 eggs of a species will be collected, and it is likely that the statistical power analysis will indicate that sufficient differences can be detected with fewer numbers of eggs. No more than 10 adults of any species will be collected, and no collection of adult brown pelican will occur. Collection of seabird eggs and adults are limited and are therefore not expected to impact the population.

Mammals

There are two mammal species of concern found on Santa Cruz Island. These are the island fox, which is listed as threatened in the State of California and is a candidate species for federal listing as endangered species and the island spotted skunk, which is a species of special concern in the State of California. As bald eagles feed primarily on fish and bird species, or on mammal carrion, it is not likely that they would have any negative impact on populations of these species. Historically, bald eagles, island foxes and island spotted skunks were all residents on the islands, and therefore have previously coexisted.

Island foxes are also found on Santa Catalina Island. As part of the Catalina bald eagle reintroduction work, over 4,000 hours of prey observations have been conducted and investigations of prey remains have been made. In all of these observations, no predation by bald eagles on island foxes was observed, and no island fox remains have been found in eagle nests. The reintroduced eagles on Catalina are one of the most intensively studied birds in the country. These food habitat studies were conducted during the time that an epidemic of canine distemper virus decimated the Catalina fox population. Though there were several dead and moribund foxes present on the island; there are no indications that bald eagles preyed upon the foxes. On one occasion a Catalina bald eagle was videotaped returning to the nest with a live piglet. The piglet was very small and probably only weighed 2-4 pounds, which is less than an adult island fox (4 1/3 to 4 ¾ pounds). This is the only occasion where an eagle was observed delivering piglets to the nest, either alive or dead. Bald eagles do, however, readily feed upon carcasses of dead pigs that they encounter in the wild on Catalina. The remains of only one other terrestrial mammal, a Catalina ground squirrel was found in an eagle nest on Catalina.

Recently, a 100-year-old bald eagle nest found on San Miguel Island was excavated and examined for nest remains. Among the thousands of bones in the nest were bones from a single old fox (Paul Collins personal communication.). It is not know if the fox was preyed upon or scavenged.

Based on the information presented above and the feeding habits of bald eagles, it is unlikely that bald eagles will adversely affect island foxes. Nonetheless, we will monitor the reintroduced bald eagles and their feeding habits during the feasibility study to determine if any predation on island fox occurs. In addition, the USFWS and the NPS will be conducting extensive work with the fox populations on the three islands, which will provide additional opportunities to detect any impacts of bald eagles on foxes. Restoring bald eagles to Santa Cruz Islands may indirectly benefit island fox populations on the northern Channel Islands.

Island foxes have undergone a catastrophic decline on San Miguel, Santa Rosa and Santa Cruz Islands (Coonan et al. 1998, Roemer 1999). The decline in their populations was caused largely by the recent

appearance of golden eagles as a resident species on the island. Golden eagles are aggressive predators of terrestrial mammals, and were never known to be year-round residents on the islands prior to the 1990s. Remains of island foxes have been found in a golden eagle nest on Santa Cruz Island, and evidence of predation by golden eagles on island foxes has been documented (Roemer 1999).

The decline of foxes has resulted in only one free-ranging fox known in the wild on San Miguel Island and Santa Rosa Island. All others foxes are being held in captivity to prevent total elimination of the population by golden eagles. Efforts are currently being undertaken to remove golden eagles on the northern Channel Island by live trapping and translocating the birds.

As bald eagles and golden eagles do not generally tolerate each other on breeding areas, this likely explains why golden eagles were not observed on the Channel Islands when bald eagles were a resident nesting species. It is believed that if bald eagles are reestablished on the island, golden eagles will be naturally excluded and the threat to island foxes from this predator will be removed or greatly reduced.

The island spotted skunks are primarily nocturnal in their habits, and therefore it is unlikely that eagles would have an opportunity to prey upon them in any significant numbers

Fishes

Although fish comprise approximately 85-95% of the bald eagle diet, it is unlikely that the reintroduction of bald eagles will cause any effect on fish abundance or diversity. Bald eagles have historically fed on fish, which are a natural prey item. Bald eagles primarily catch fish at the surface (as opposed to diving for fish below the surface as cormorants and pelicans do) and have been documented feeding on large swarms of small fish such as the northern anchovy, sardines, herring and mackerel (Rodway and Lemmon 1991, Sharpe personal communication). These fish are especially abundant off the northern islands due to increased primary productivity from regional upwelling (Channel Islands Management Plan Review, 2001). Off Catalina Island, bald eagles have been seen retrieving other species of fish such as yellow-eyed rockfish and kelp bass that have been discarded by private and recreational fishermen (Sharpe personal communication).

Socioeconomic

On Santa Cruz Island TNC and the NPS regulate visitor use. It is unlikely that the reintroduction of bald eagles to Santa Cruz Island would cause an increase of visitors to the Island. Even without restricted use, visitor attendance on Catalina Island did not increase after the bald eagle reintroduction program began (Sharpe personal communication).

Beach communities

Bald eagles feed on carrion and will likely be found feeding on dead marine mammals that wash up on shore. This behavior may interfere with other scavenging animals but these impacts are negligible.

Cumulative Effects

A primary goal of Channel Islands National Park is to restore the naturally functioning ecosystem of the park islands and surrounding waters. Primary actions in the restoration of these ecosystems are removal of non-native species and restoration of native species that no longer occur in the system. The implementation of this proposed Feasibility Study will assist the Park and it's partners in achieving their goal. It is believed restoring bald eagles to the northern Channel Islands will naturally repel golden eagle and remove or greatly reduce the threat to island foxes from this predator. Because bald eagles and golden eagles do not generally tolerate each other on breeding areas, this likely explains why golden eagles were not observed on the Channel Islands when bald eagles were a resident nesting species.

The park and its' partners have made tremendous progress correcting the environmental damage that occurred on the islands. Seals and sea lions have substantially recovered from harvesting during the

1700's and 1800's. Removal of non-native species (rabbits, cats, feral sheep, cattle, burros, and feral pigs) has allowed substantial natural recovery of endemic plants and animals that occur only on the Channel Islands. The banning of DDT in the 1970's allowed for the recovery of California brown pelican and cormorant populations, which had suffered serious declines. Additionally, with human intervention, a portion of the breeding population of peregrine falcons was reestablished on the Channel Islands.

Nonetheless, the Channel Islands have not been fully restored to a naturally functioning ecosystem. The connections among ecosystem components are sometimes not apparent until an important species is gone. The loss of bald eagles from the Channel Islands has had widespread negative consequences that will not be corrected until bald eagles are restored. The combination of the extirpation of bald eagles, introduction of non-native pigs, and the removal of native shrublands by grazing animals created an unnatural situation in which golden eagles, not a native resident on the islands, could flourish. The result—predation by non-native golden eagles has driven three sub-species of island foxes to near extinction

The National Park Service will be carrying out the eradication of feral pigs throughout the period of this FS. These two projects will increase the amount of administrative activity on Santa Cruz Island including increased human visitors, more vehicle use, and additional boat transportation. The pig eradication project will not negatively affect the FS. Lead bullets will be not be used when hunting the pigs so there will be no risk of lead poisoning to bald eagles that may forage on pig carcasses. Pig carcasses may provide occasional food to bald eagles. However, the bald eagles on Catalina Island have made little use of pig carcasses.

The FS may have potential short-term impacts to other on-going restoration projects in the Southern California Bight. The American Trader Natural Resource Settlements Trustee Council, in conjunction with the NPS and the Island Conservation Group, is in the processing of eradicating the black rat from Anacapa Island to benefit the threatened Xantus's murrelet, other seabirds, native deer mice, and other plants and animals. Introduced bald eagles may prey upon Xantus's murrelets thereby slowing the rate of recovery of these birds following the removal of their predator the black rat. However, as discussed above, the trustees do not expect the impacts to murrelets to be significant. Therefore the impacts to the Anacapa Island Restoration Project should be negligible.

Non-impairment of national park resources

The NPS Organic Act and the General Authorities Act prohibit the NPS from undertaking activities that would impair park resources. NPS Management Policies (Sec. 1.4.5) indicate that impairments are those actions or projects that "would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values."

The proposed feasibility study is a step towards correcting an impairment that occurred to the ecosystem of the Channel Islands. The Trustees believe that the proposed action will not affect the listed plant species and is not likely to adversely affect the California brown pelican, western snowy plover, or the island fox. Informal conferencing with FWS supports this determination. A letter with this determination will be sent to the FWS in conjunction with the FS/EA.

Bald eagles are largely scavengers, however, they do prey on birds and fish. Bald eagles are not expected to contribute to future endangerment of any species. In fact, predation by bald eagles in the Channel Islands ecosystem is a natural process that contributes to sustenance of the ecosystem. There will be short-term minimal impacts to soils and vegetation at the site of hack box construction. This level of impact does not rise to the level of impairment and is an unavoidable result of reestablishing a native species.

Section 5 Public Involvement / Comments

Public review of the Feasibility Study and Environmental Assessment was an integral component of the restoration planning process. Through the public review process, the Trustees solicited public comment on the specifics of the study. This Final FS/EA provides the public with the available information about the proposed study and alternatives being considered. For up-to-date information on the Feasibility Study please visit our website at: www.darcnw.noaa.gov/montrose.htm.

The Trustees considered comments received during the public comment period before completing decision making regarding the Feasibility Study. Appendix B contains the Trustees responses' to public comments received during the comment period. Public review of the FS/EA is consistent with all federal and state laws and regulations that apply to the NRDA process including NEPA, as amended (42 USC 4371 *et seq.*), and its implementing regulations (40 CFR Parts 1500-1508).

A public meeting was held on this FS/EA at the Channel Islands National Park Headquarters in Ventura, California. At this meeting the Trustees provided a general overview of the plan and accepted both oral and written comments at that time. The public review period for the FS/EA will ended on April 4, 2002.

Section 6 Compliance with other Authorities

Overview

The three major laws guiding the restoration of the injured resources and services for the Montrose Settlements Restoration Program are CERCLA, CEQA and NEPA. These statutes set forth a specific process of impact analysis and public review. In addition, the Trustees must comply with other applicable laws, regulations and policies at the federal, state and local levels.

The potentially relevant laws, regulations and policies are set forth below. In addition to laws and regulations, the Trustees must consider relevant environmental or economic programs or plans that are ongoing or planned in or near the affected environment. The Trustees must ensure that their proposed restoration activities neither impede nor duplicate such programs or plans. By coordinating restoration with other relevant programs and plans, the Trustees can enhance the overall effort to improve the environment affected by the incident.

Key Statutes, Regulations and Policies

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund) 42 U.S.C. 9601 et seq.

CERCLA provides the basic legal framework for cleanup and restoration of the nation's hazardous substances sites. Under CERCLA, responsible parties are liable for damages, including reasonable assessment costs, for injuries to, or the loss of, natural resources. The term "natural resources" is broadly defined by CERCLA to mean "land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, . . . any State or local government, any foreign government, or any Indian tribe . . . ." The statute provides that parties responsible for contamination of sites and the current owners or operators of contaminated sites are liable for the cost of clean up and for damages to natural resources. Compensation is used to restore, replace, rehabilitate, or acquire the equivalent of natural resources and services. The Feasibility Study, and the restoration effort of which it is an element, will be conducted in accordance with CERCLA.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (Pub. Res. Code §§ 21000-21178.1), commonly referred to as CEQA, was adopted in 1970 and applies to most public agency decisions to carry out, authorize or approve projects that may have adverse environmental impacts. CEQA requires that agencies inform themselves about the environmental effects of their proposed actions, consider all relevant information, provide the public an opportunity to comment on the environmental issues, and avoid or reduce potential environmental harm whenever feasible.

The CEQA process begins with a preliminary review as to whether CEQA applies to the project in question. Generally, a project is subject to CEQA if it involves discretionary action by an agency that

may cause a significant effect on the environment. Once the agency determines that the "project" is subject to CEQA, the lead agency must then determine whether the action is exempt under either a statutory or categorical exemption, 14 Cal. Code Regs. 15061.

If the lead agency determines that the project is not exempt then an initial study must be prepared to determine whether the project may have a potentially significant effect on the environment. 14 Cal. Code Regs. §§ 15063, 15102. Based on the initial study, the lead agency determines the type of CEQA documentation that will be prepared. The test for determining whether an environmental impact report (EIR) or negative declaration must be prepared is whether a fair argument can be made based on substantial evidence that the project may have a significant effect on the environment. CEQA encourages the use of an EIS or finding of no significant impact or combined state/federal documents in place of a separate EIR or negative declaration. Pub. Res. Code §§ 21083.5, 21083.7, 14 Cal. Code Regs. §§ 15221-15222.

After reviewing the proposed feasibility study, the State Trustee (CDFG) has determined that the study will not have a substantial, or potentially substantial, adverse change in any of the physical conditions within the areas affected by the projects. Additionally, the State Trustee considers this study to be categorically exempt pursuant to: (1) 14 Cal. Code of Regs. Section 15304, "Minor alterations to land, water, or vegetation"; (2) 14 Cal. Code of Regs. Section 15307, "Actions by regulatory agencies for protection of natural resources", and (3) 14 Cal. Code Regs. Section 15308, "Actions by regulatory agencies for the protection of the environment."

The Trustees have integrated both NEPA and CEQA requirements into this feasibility study.

National Environmental Policy Act (NEPA), as amended, 42 USC 4321, ***et seq.***, **40 CFR Parts 1500-1508**

Congress enacted NEPA in 1969 to establish a national policy for the protection of the environment. NEPA applies to federal agency actions that affect the human environment. NEPA established the Council on Environmental Quality (CEQ) to advise the President and to carry out certain other responsibilities relating to implementation of NEPA by federal agencies. Pursuant to Presidential Executive Order, federal agencies are obligated to comply with the NEPA regulations adopted by the CEQ. These regulations outline the responsibilities of federal agencies under NEPA and provide specific procedures for preparing environmental documentation to comply with NEPA. NEPA recommends that an Environmental Assessment (EA) be prepared in order to determine whether or not a proposed action may have a significant effect on the quality of the human environment.

Generally, when it is uncertain whether an action will have a significant effect, federal agencies will begin the NEPA planning process by preparing an EA. The EA will undergo a public review and comment period. Federal agencies may then review the comments and make a determination. Depending on whether an impact is considered significant, a Notice of Intent to prepare an environmental impact statement (EIS) or a Finding of No Significant Impact (FONSI) will be issued.

The Trustees have integrated this Feasibility Study with the NEPA and CEQA processes to comply, in part, with those requirements. This integrated process allows the Trustees to meet the public involvement requirements of NEPA and CEQA concurrently. The FS/EA is intended to accomplish partial NEPA and CEQA compliance by: (1) summarizing the current environmental setting, (2) describing the purpose and need for action, (3) identifying alternative actions, (4) assessing the alternative actions' environmental consequences, and (5) summarizing opportunities for public participation in the decision process.

National Park Act of August 19, 1916 (Organic Act), 16 USC 1, et seq.

The National Park Service Organic Act of 1916 created today's National Park Service (NPS) within the U.S. Department of the Interior. The NPS is charged with promoting and regulating the use of the national parks "by such means and measures as conform to the fundamental purpose to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment for the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

To achieve this mandate, the Organic Act gives the NPS broad authority to manage the parks, directing the Secretary of the Interior to "make and publish such rules and regulations as he may deem necessary or proper for the use and management of the parks, monuments, and reservations under the jurisdiction of the National Park Service."

Coastal Zone Management Act (CZMA), 16 USC 1451, ***et seq.*, 15 CFR Part 923**

The goal of the federal CZMA is to preserve, protect, develop and, where possible, restore and enhance the nation's coastal resources. The federal government provides grants to states with federally approved coastal management programs. The State of California has a federally approved program. Section 1456 of the CZMA requires that any federal action inside or outside of the coastal zone that affects any land or water use or natural resources of the coastal zone shall be consistent, to the maximum extent practicable, with the enforceable policies of approved state management programs. It states that no federal license or permit may be granted without giving the State the opportunity to concur that the project is consistent with the state's coastal policies. The regulations outline the consistency procedures.

The Trustees do not believe that the Feasibility Study will adversely affect the state's coastal zone. However, to comply with the CZMA, the Trustees intend to seek the concurrence of the State of California that their preferred alternative is are consistent to the maximum extent practicable with the enforceable policies of the state coastal program.

California Coastal Act, California Public Resources Code sections 30000 *et seq.*

The California Coastal Act (California Public Resources Code § 30000 et seq) was enacted by the State Legislature in 1976 to provide long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. The Coastal Act created a partnership between the State (acting through the California Coastal Commission) and local government (15 coastal counties and 58 cities) to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program.

The Commission's authority (called federal consistency review) comes from the Federal Coastal Zone Management Act (CZMA). After California's Coastal Management Program (CCMP) was approved by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce pursuant to the CZMA in 1977, all federal activities affecting coastal zone resources became subject to the Commission's regulatory jurisdiction.

The Trustees do not believe that the Feasibility Study will adversely affect California's coastal zone resources. However, the Trustees intend to seek California's Coastal Commission's concurrence that their preferred alternative is consistent with California's federally approved Coastal Management Program

Endangered Species Act (ESA), 16 USC 1531, ***et seq.*, 50 CFR Parts 17, 222, 224**

The federal ESA directs all federal agencies to conserve endangered and threatened species and their habitats and encourages such agencies to utilize their authorities to further these purposes. Under the Act, the National Marine Fisheries Service (NMFS) and the USFWS publish lists of endangered and threatened species. Section 7 of the Act requires that federal agencies consult with these two agencies to minimize the effects of federal actions on endangered and threatened species. Prior to implementation of the Feasibility Study, the Trustees will conduct Section 7 consultations with the USFWS.

California Endangered Species Act, Fish and Game Code §§ 2050 *et seq.*

It is the policy of the State of California that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species if there are reasonable and prudent alternatives available. If reasonable alternatives are infeasible, individual projects may be approved if appropriate mitigation and enhancement measures are provided. Under this act, the Fish and Game Commission established a list of threatened and endangered species based on criteria recommended by the Department of Fish and Game.

Magnuson-Stevens Fishery Conservation and Management Act , 16 USC 1801 ***et seq.***

The federal Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as amended and reauthorized by the Sustainable Fisheries Act (Public Law 104-297) establishes a program to promote the protection of essential fish habitat (EFH) in the review of projects conducted under federal permits, licenses, or other authorities that affect or have the potential to affect such habitat. After EFH has been described and identified in fishery management plans by the regional fishery management councils, federal agencies are obligated to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH.

The Trustees believe that the proposed Feasibility Study will have no adverse effect on EFH and will promote the protection of fish resources and EFH.

Fish and Wildlife Coordination Act (FWCA), 16 USC 661, ***et seq.***

The federal FWCA requires that federal agencies consult with the USFWS, NMFS, and state wildlife agencies for activities that affect, control or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat. This consultation is generally incorporated into the process of complying with Section 404 of the Clean Water Act, NEPA or other federal permit, license or review requirements.

The Trustees do not expect the Feasibility Study to implicate the FWCA, but may consult with the appropriate agencies.

Executive Order (EO) 12898 - Environmental Justice

On February 11, 1994, President Clinton issued EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This EO requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low income populations. EPA and the CEQ have emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and of developing mitigation measures that avoid disproportionate environmental effects on minority and low-income populations. The Trustees have concluded that there are no low income or ethnic minority communities that would be adversely affected by the proposed Feasibility Study.

Environmental Justice further requires federal agencies to provide opportunities for community input in the NEPA process. The Trustees will make every effort to involve the affected community by providing notice to members of the public and access to related documents.

Marine Mammal Protection Act (MMPA), 16 U.S.C. 3371-3378, et seq.

Under the MMPA, the Secretary of Commerce is responsible for the conservation and management of pinnipeds (other than walruses) and cetaceans. The Secretary of the Interior is responsible for walruses, sea and marine otters, polar bears, manatees, and dugongs. The Secretary of Commerce delegated MMPA authority to NMFS. Title II of the Act established an independent Marine Mammal Commission and its Committee of Scientific Advisors to oversee and recommend actions necessary to meet the intents and provisions of the Act. The Act provides that the Secretary shall allow the incidental, but not intentional, taking, by U.S. citizens engaged in activities other than commercial fishing of small numbers of depleted as well as non-depleted marine mammals if, after notice and opportunity for public comment, the Secretary finds that the total of such taking will have a negligible impact on the affected species or stock, and prescribes regulations setting forth permissible methods of taking, and requirements for monitoring and reporting such taking." However, the 1994 Amendments provide that this regulation requirement may be waived provided that the proposed activity results in only harassment, and no serious injury or mortality is anticipated.

The Trustees do not expect the Feasibility Study to "take," "harass," or "injure" any species protected under the MMPA.

Migratory Bird Treaty Act of 1918, 16 U.S.C. 703, et seq.

The Migratory Bird Treaty Act (MBTA) implements four international treaties involving protection of migratory birds, including all marine birds, and is one of the earliest statutes (amended several times) to provide for avian protection by the Federal Government. Among its other provisions, it broadly prohibits actions to "pursue, hunt, take, capture, kill, attempt to take, kill, possess, offer for sale, sell, offer to purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird...or any part, nest, or egg of such bird." Exceptions to these prohibitions are only allowed under regulations or permits issued by USFWS. Hunting of game birds, including waterfowl and certain shore birds, is annually regulated through a process in which the USFWS sets "framework regulations" based on the best current population data available, and States pass regulations that conform to those Federal regulations. All other prohibited actions are only allowed under specific permits issued by the USFWS. Criminal violations of this Act are

enforced by USFWS, and it is also the primary statute under which USFWS and Interior have responsibility to manage all migratory birds wherever they occur, including marine birds.

The MBTA also is the basis for USFWS oversight and permitting of collection and preservation or rehabilitation of birds oiled during spill response, which usually provides the primary data for determining extent of injury to marine birds and the need for restoration.

The Feasibility Study will be conducted in full compliance with the MBTA.

Bald and Golden Eagle Protection Act, 16 U.S.C. 668,668 note, 668a-668d

The Bald and Golden Eagle Protection Act of 1940. as amended, provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.

Section 668a of the Act authorizes the Secretary of the Interior to permit the taking, possession, and transportation of eagles upon a determination that such taking, possession, or transportation is compatible with the preservation of the bald eagle or the golden eagle.

The Trustees will fully comply with all requirements of the Bald and Golden Eagle Protection Act in implementing the Feasibility study.

OTHER POTENTIALLY APPLICABLE LAWS AND REGULATIONS

The Lacey Act, 16 United States Code §3371 *et seq.*

The Lacey Act Amendments of 1981 make it unlawful to import, export, transport, buy or sell fish, wildlife and plants taken or possessed in violation of federal, state or tribal law. Interstate or foreign commerce in fish and wildlife taken or possessed in violation of foreign law also is illegal. The Act requires that packages containing fish or wildlife be plainly marked. Enforcement measures include civil and criminal penalties, cancellation of hunting and fishing licenses, and forfeiture.

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- Chuck Henny , U.S. Geological Service
- Keith Hobson, Canadian Wildlife Service
- Bridget Fahey, U.S Fish and Wildlife Service
- Lynn Lozier, The Nature Conservancy
- Erik Aschehoug, The Nature Conservancy

Appendix A- Monitoring Program for Bald Eagle Feasibility Study for Reintroduction to the Northern Channel Islands

Background

Bald eagles (*Haliaeetus leucocephalus*) were historic resident breeding species on all eight of the California Channel Islands, and were extirpated by the 1960's; the primary cause of the extirpation is believed to be DDT released into the environment (Kiff 1980, 2000). It is estimated that a minimum of 35 bald eagle nest sites existed on the Channel Islands earlier this century, making the Channel Islands a stronghold for this species in Southern California (Kiff 2000). On the Northern Channel Islands (Anacapa, Santa Cruz, Santa Rosa, and San Miguel Islands), Kiff (2000) estimated that there were a minimum of 24 different nest territories, with a maximum of 14 nesting pairs observed in any one year. Kiff (2000) documents the number of bald eagle territories on Anacapa Island as 3, San Miguel and Prince Island as 6, Santa Cruz Island as 7, and Santa Rosa Island as 8. Kiff notes that the actual number of bald eagle nesting territories on Santa Cruz and Santa Rosa Islands was undoubtedly greater since historical accounts are based largely from collectors who did not visit many portions of these large islands. To date, bald eagles have not naturally reestablished on the Channel Islands. Bald eagles were reintroduced to Catalina Island starting in the early 1980's. However, due to the continuing levels of DDT in the food web of the Southern California Bight, bald eagles on Catalina Island still are unable to reproduce successfully due to DDE effects on eggshell quality resulting in breakage of eggs and severe water loss, and require intensive management to maintain the population (Garcelon testimony 2000, Garcelon 1997).

The realization in the mid to late 1980's that bald eagle reproduction on Catalina Island was not successful due to effects associated with very high residues of DDE in the eggs was one indication among many that the massive releases of DDT into the Southern California Bight were still ecologically relevant. In 1990, the State of California and the Federal Government Natural Resource Trustees brought suit against Montrose Chemical Corporation (Montrose), among other dischargers, for releases of DDT and PCBs that injured natural resources including bald eagles, peregrine falcons and fishery resources. In December of 2000, the Natural Resource Trustees settled the final remaining legal claim brought against Montrose and the other dischargers. Approximately $30 million is now available for the restoration of the injured resources. Bald eagles were identified as one of the primary resources that continue to be impacted by DDT contamination. Federal law requires that restoration dollars be spent to "restore, rehabilitate, replace, or acquire the equivalent" resources that were injured.

As part of restoration planning efforts prior to the case settling, a predictive risk assessment for reintroducing bald eagles to the Northern Channel Islands (NCI), was conducted (Valoppi et al. 1999, Valoppi et al. 2000). The goal of the predictive risk assessment was not to determine the degree of likely breeding success of bald eagles reintroduced to the Northern Channel Islands. Instead, the Trustee Council wanted to know if a naturally reproducing, stable population of bald eagles could be established on the Northern Channel Islands (i.e., if at least a productivity of 0.7 young/nest would be likely). There was limited data for DDE and PCB residues in eagle prey for the immediate area around the Islands, so assumptions were made concerning the level of contaminants in prey available on the Northern Channel Islands. For example, very limited fish residue data was available, which suggested fish residues might be 2-fold higher on the Northern Channel Islands than on Catalina, so this assumption was used in the model. The predictive risk assessment concluded that it was unlikely that a naturally reproducing, stable population of bald eagles could be established due to DDT contamination predicted to occur in eagle eggs. However, there was a large degree of uncertainty concerning the availability of marine mammal carcasses on the Northern Channel Islands, as well as a large variability in prey concentrations of DDT,

such that it was not possible to say with great confidence what level of bald eagle productivity would be expected.

With the settlement of the case, the Natural Resource Trustees have determined that an experimental release of bald eagles to Santa Cruz Island is warranted. This view acknowledges the uncertainties of the risk assessment, but balances these against the obligation to restore the injured resource if possible, the very low probability that the bald eagles will naturally repopulate the Channel Islands in the absence of active management (Garcelon 2000), the high importance of the Channel Islands as breeding territory in Southern California (Jurek 2000), and the goals of the Bald Eagle Recovery Plan (U.S. Fish and Wildlife Service 1986). The Feasibility Study involves the release of bald eagles onto Santa Cruz Island and monitoring the eagles to obtain information on contamination of the eagles and the eagle food web, and the potential for breeding success. This information will be used by the Natural Resource Trustees to determine whether full-scale restoration efforts on other Channel Islands should be initiated, or whether it is more prudent to try to focus restoration efforts elsewhere.

Input from Scientific Experts

In the summer of 2001, the U.S. Fish and Wildlife Service convened a meeting of a few experts to provide guidance on monitoring of bald eagles released to the Northern Channel Islands as part of a reintroduction feasibility study. The group of experts included John Elliott (Canadian Wildlife Service), Stan Wiemeyer (U.S. Fish and Wildlife Service), Chuck Henny (U.S. Geological Survey), and Keith Hobson (Canadian Wildlife Service). Each expert was chosen for his expertise in monitoring organochlorine contaminants in raptors, and his experience in evaluating techniques for assessing dietary foodwebs. At issue was how best to conduct a monitoring program for the Feasibility Study to determine if restoration to the Northern Channel Islands will be successful given the potential for elevated levels of DDE in the food web. The experts were requested to :

1. Advise on techniques for monitoring bald eagle DDE exposure.

2. Advise on techniques for evaluating the diets of bald eagles released to the Northern Channel Islands.

3. Advise on biases inherent in various monitoring techniques and how to address bias.

4. Advise on the level of reliability needed for the monitoring program, and the desired number of sample or data points needed to achieve that level of reliability.

5. Advise on decision criteria for further reintroduction..

The experts each wrote a report recommending specific aspects of a monitoring program that the Natural Resource Trustees have considered in developing this proposed monitoring plan (Elliott 2001; Wiemeyer 2001; Henny 2001; Hobson 2001).

Discussion of Monitoring Plan Elements

Based on the collective recommendations of the scientific experts, the following elements for a monitoring program of juvenile bald eagles to be released to Santa Cruz Island have been considered. It must be emphasized that this monitoring plan is viewed as adaptive – elements of the plan may be changed based upon usefulness and feasibility of the collected data. It is anticipated that some or all of

the previously consulted experts, or others, will evaluate the monitoring data as it becomes available to advise on possible changes to the monitoring plan.

1. Stable Isotopes - Use stable isotope analysis of tissues of juvenile bald eagles and the bald eagle food web of the Channel Islands to determine sources and trophic levels which eagles may be feeding on, which would indicate higher or lower DDE residues in the diet. An initial study using the eagle tissues and prey collected from Catalina Island will be conducted to determine if this technique is feasible and useful for the Northern Channel Islands.

2. Blood Analysis - Conduct sampling and analysis of DDE residues in juvenile bald eagle blood, or other non-lethal tissue monitoring.

3. Radiotelemetry/Food Habits - Conduct radiotelemetry of juvenile bald eagles to monitor their dispersal and movement. These techniques will also provide information on locations where repeated juvenile bald eagle foraging activities are occurring (e.g. seabird breeding sites). In addition, it will allow evaluation of food habits of bald eagles that remain on the Northern Channel Islands to determine their inclination to ingest high DDE-containing prey items (e.g. marine mammal carcasses, certain seabirds, etc...).

4. Contaminant prey analysis and Trend Analysis - Collect bald eagle prey items to evaluate whether to refine the inputs to the predictive risk assessment. Trend analysis would consist of collecting seabird eggs to evaluate against the data collected by Fry (1994).

5. Osprey (*Pandion haliaetus*) - Release osprey to the Northern Channel Islands and use osprey breeding success as an indicator of bald eagle breeding success (osprey are fish eating birds that are slightly less sensitive than bald eagles to the effects of DDE for reproductive effects).

Stable Isotope Analysis of Bald Eagle Tissues

Staff at the San Francisco Zoo, where the Catalina bald eagle eggs are artificially incubated, have indicated that the eagles from the Twin Rocks territory on Catalina lay eggs which are slower to lose water, and die later in embryo development compared to the other nest sites on Catalina (pers comm. Kathy Hobson). Limited residue data from the Twin Rocks territory indicates that these eggs have among the lowest concentrations of DDE. In the last few years, all of the eggs that hatched were from the Twin Rocks territory. This information suggests that there may be feeding differences between the Twin Rocks territory and the other territories on Catalina that result in lower DDE exposure for Twin Rocks bald eagles. The Twin Rocks nest is on the north side of the island, on a steep cliff with limited access to beaches where marine mammal carcasses may wash up.

Stable isotope analysis could be a viable technique to determine if there are differences in diet between Catalina Island territories that result in eggs with lower DDE residues. Initially, this will be accomplished by analyzing a variety of eagle tissues (mostly egg residues and eggshells, some blood samples) from Catalina Island, along with some tissue from eagle prey (e.g. seabird, marine mammal). Later, it may be feasible to add some additional components of stable isotope sampling of Catalina birds in subsequent years (e.g. blood or feather samples). The basic approach is to investigate whether stable isotope analysis can be used to differentiate diets between bald eagle nesting territories on Catalina Island, and then evaluate whether stable isotope techniques would be helpful for evaluating diets of bald eagles released to the Northern Channel Islands.

Elements occur in nature in both stable and radioactive forms (radioactive forms are nonstable). Elements in nature usually occur in more than one stable form, referred to as stable isotopes of that element (isotopes differ in the number of neutrons in the nucleus, but have the same number of protons and electrons). The different number of neutrons give each isotope of an element slightly different chemical and physical properties. These differences mean that the isotopes of an element behave differently in natural systems from the physical and chemical process that react with the isotopes over time. The differences in the proportion of one isotope over another isotope of the same element provides the key to discriminating differences in dietary exposure. The stable isotope analysis measures naturally occurring stable isotopes of specific elements (e.g., carbon, nitrogen) that are present in the food web. Stable-nitrogen isotope abundance in bald eagle tissues from Catalina Island could help determine trophic positions and changes in diet over time. Stable-carbon isotopes could provide information on inshore versus offshore sources of prey in the marine environment, and possibly the contribution from terrestrial sources. Hobson (2001) recommended measuring nitrogen and carbon isotopes in archived egg yolk or homogenates for which we have contaminant information. A biplot of stable nitrogen versus stable carbon would help to determine if individual birds laying more contaminated eggs tend to cluster according to trophic level and location of prey (Hobson 2001).

In the first phase, Hobson (2001) recommended conducting stable isotope analysis on already collected eggshells and membranes of Catalina eggshells. Relationships between DDE concentrations, stable isotopes, and breeding history of the nest from where the egg came from would help in examining short-term dietary exposures, i.e. immediately prior to laying of individual eggs.

In the second phase, Hobson (2001) recommended opportunistically collecting blood and feather samples for analysis of isotopic signature of carbon and nitrogen from captured individuals on Catalina Island. This would identify a non-lethal tissue to sample from captured eagles to analyze for stable isotopes. This may not be feasible during the breeding season, as the capturing would potentially disrupt breeding activity. However, it may be possible to collect these samples during the non-breeding season. Related to analysis of feather samples on live birds, is the analysis of feather, or other tissues (muscle, bone) from carcasses of dead birds. One adult female has died in all likelihood of DDE poisoning (Garcelon and Thomas 1997), and DDE values from this hen's eggs have been among the highest concentrations of DDE recorded at Catalina Island (Seal Rocks territory, 1990 and 1992).

In the final phase, Hobson (2001) recommended collecting a suite of foodweb samples for the creation of a foodweb isotope model. Development of such an isotope model could be done once it has been determined from the examination of the egg homogenate, eggshell and egg membrane isotope analysis that differences in trophic level feeding are discernible among bald eagle territories on Catalina Island. Construction of an isotope food web model would necessitate taking marine food items that span several trophic levels and represent inshore/benthic and off shore/pelagic organisms (Hobson 2001).

DDE Residues in Bald Eagle Blood

Elliott (2001) summarized the value of measuring contaminant residues in blood to evaluate body burden and exposure to raptors, and concluded that this is a valid method of monitoring, provided the influence of food intake and fasting on plasma lipid concentrations is taken into account. Elliott (2001) provided a simple visual method of screening blood samples which are highly lipemic, and also recommended analyzing the blood samples for plasma lipid content, in addition to contaminant residues.

Elliott (2001) recommended attempting to trap bald eagles released to the Northern Channel Islands at older than one year of age to allow for body burdens of organochlorines to equilibrate with dietary exposures. Use of both solar powered satellite transmitters and conventional transmitters with long

battery life on all released birds will help facilitate tracking. Waiting to trap bald eagles until at least 1 year after release would also allow for juvenile dispersal away from the Channel Islands to occur, and therefore limit the number of birds that would need to be trapped. Elliott (2001) recommended trapping released birds at 2 years post release, and attempting to trap again at 3 years post-release. The difficulty in trapping bald eagles should not be underestimated; the feasibility of trapping an eagle the second time is not certain. While blood residues of DDE will provide very useful information, blood DDE cannot be relied upon solely for decision making given the uncertainties of being able to successfully trap bald eagles.

The next issue becomes how to interpret the DDE blood residue data from the juvenile bald eagles released to the Northern Channel Islands once it is available. Elliott and Norstrom (1998) and Elliott and Harris (2002) have developed relationships between DDE in nestling plasma and DDE concentrations in eagle eggs. Limited data from Catalina Island is available for DDE residues in blood of juvenile, sub-adults and adults, for comparison. There are very few published results of DDE residues in juvenile and sub-adult bald eagles; the available data has been summarized by Elliott (2001, Table 1). Elliott recommended analyzing any existing, unanalyzed Catalina Island bald eagle blood samples for residue analysis, and conducting a statistical analysis of the existing plasma samples from Catalina Island bald eagles. Collection of additional samples from juvenile and sub adults at Catalina to establish a reference area for known DDE contamination and productivity may also be needed.

A "clean" reference area should be established as well. Two options have been identified for the clean reference area: 1) eagles nesting on reservoirs in Southern California, or 2) eagles feeding in marine and estuarine environments from Oregon, Washington, Alaska, and British Columbia. The latter locations may already have archived blood samples which could be sampled for DDE analysis. We believe using a clean reference area from Oregon, Washington, Alaska, or British Columbia is preferable (compared to eagles nesting on reservoirs) because these locations may already have substantial contaminant history and productivity data. In addition, coastal environments would more closely match the feeding habits of Channel Islands bald eagles.

In addition to DDE residue analysis of the eagle plasma, other assays are recommended (in order of suggested priority): total PCBs in plasma, total mercury in whole blood, total lead in whole blood, haematocrit and blood smears for cell counts and parasites, standard veterinary blood screening, rodenticide residues in plasma, cholinesterase activity in plasma, and Vitamin A and thyroid hormones in plasma. As noted previously, stable isotope analysis of bald eagle blood may also prove valuable in interpreting feeding trophic level.

Food Habits and Availability

Elliott (2001) recommended that all bald eagles released to the Channel Islands be color banded and tagged with both satellite and conventional radio telemetry transmitters. Wiemeyer (2001) also recommended both types of telemetry be utilized for bald eagles released to the Northern Channel Islands. Wiemeyer indicated that data from satellite telemetry is needed to obtain data on overall movements, and would provide information on the overall range of the bird during a 24 hour period. Satellite transmitters can be expected to last 5 years. Once the general location of a bird is tracked using the satellite data, conventional telemetry can be used to track birds during specific times or locations for defining feeding locations and habits. Blinds could be set up near feeding areas to allow direct observations of specific feeding activity, frequency, and amount ingested (biomass) (Wiemeyer 2001; Henny 2001). The use of both satellite and conventional telemetry would also be useful for collection of blood and feather samples for contaminant residues or stable isotope analysis (Wiemeyer 2001).

The monitoring plan will include placing both conventional VHF transmitters and GPS/ARGOS satellite transmitters on each of the eagles released on the Northern Channel Islands. The conventional VHF transmitters will assist in locating bald eagles while they are in the general release area, while the satellite transmitters will allow for long-range tracking of the eagle's movements. Use of both types of transmitters will help in determining whether bald eagles are repeatedly visiting known seabird nesting colonies or marine mammal rookeries, as well as providing general tracking information. A solar powered GPS transmitter can operate for about 3 years. Attempts will be made to capture and take samples of blood from eagles aged 2 years or older that have remained on, or returned to, the Northern Channel Islands. Once captured, the transmitters can be replaced, thereby extending the effective time of tracking for at least some of the bald eagles released.

The predictive risk assessment (Valoppi, et al. 2000) indicated that the marine mammal component of the bald eagle diet contributes the most uncertainty to the model results (both the frequency of marine mammal ingestion as well as concentration of contaminants in the tissue). Beach surveys for dead or stranded animals are periodically conducted on San Miguel and Santa Rosa Islands as part of another program for the Channel Islands National Park. Ideally, these beach watch surveys could be expanded to include islands where bald eagles are released and surveys conducted monthly, or at least quarterly (i.e., monthly monitoring on each of the 4 Northern Channel Islands). However, discussions with National Park Service staff have indicated that logistical considerations of conducting beach watch surveys on Santa Rosa Island and San Miguel Island are extremely difficult due to the limited accessibility, no available housing, and no available transportation. The beach watch surveys could be redirected to other Northern Channel Islands if telemetry data indicate eagles are feeding near known marine mammal haul out or rookery sites (e.g. Point Bennett on San Miguel Island).

Therefore, the monitoring plan will include the beach watch surveys only on Santa Cruz Island, where the eagles will be released. Data on the location, species, and number of beached marine mammals will also be recorded (Wiemeyer 2001). Remote video cameras should be set up to monitor beached marine mammals located near bald eagle feeding areas to record and estimate the frequency of use and quantity of marine mammal carcass consumed. Samples of tissue for contaminant residues and stable isotope analysis should be conducted to refine the inputs into the predictive model (Wiemeyer 2001).

Samples of marine mammal tissues previously collected for contaminant residues were heterogeneous, being a mix of blubber plug samples from live adults, and composite samples of blubber, skin, and muscle taken from carcasses found on Santa Catalina Island. These data have high variability in contaminant residues due at least in part to the different types of samples taken. Sampling of marine mammal tissue for the feasibility study will be opportunistic, and sample protocols will be developed in order to obtain as homogeneous a sample set as possible with respect to tissue type sampled. Separate samples of blubber and muscle from marine mammal carcasses will be opportunistically collected and analyzed for DDE and PCB residues during the first year. Data from the first year's sampling will be used in a statistical power analysis to determine the number of sample needed in subsequent years of the feasibility study.

Prey Contaminant Analysis

Contaminant residue data collected in the early 1990s were used to estimate concentrations of DDT and PCBs in bald eagle prey (as summarized in Valoppi et al. 2000; HydroQual, Inc. 1997). These data are now almost 10 years old. Limited contaminant residue data are available on prey species around the northern Channel Islands (Valoppi et al. 2000). Henny (2001) emphasized the need to determine if DDE residues in bald eagle prey have decreased over the last decade, or if contaminant residues are lower around the Northern Channel Islands compared to that assumed in the predictive model. Henny (2001)

indicated that collecting and analyzing prey items for DDE and PCB residues would provide the following information:

a) present-day DDE and PCB concentrations of prey around the Northern Channel Islands,

b) long-term trends in DDE concentrations in prey collected around Santa Catalina Island,

c) improved validation of the predictive model through refinement of the egg-carcass residue relationship.

Henny (2001)recommended collecting at least 10 eggs each from 5 species of seabirds: ashy storm-petrel (*Oceanodroma homochroa*), pigeon guillemot (*Cepphus columba*; Santa Cruz Island), brown pelican (*Pelecanus occidentalis*) and double-crested cormorant *(Phalacrocorax auritus*) from Anacapa Island, and western gull (*Larus occidentalis*) either Santa Cruz or Anacapa Islands). After receiving public comment and discussions with the staff in the trustee agencies, it was decided that trend analysis of contaminant prey in seabird eggs was a worthwhile study to answer questions about contaminant trends in the Southern California Bight as part of the larger restoration planning effort. However, since bald eagles do not eat seabird eggs, but do eat whole body birds, it was decided that this monitoring program would be restricted to collecting and analyzing whole body birds for contaminant analysis. These data would decrease the uncertainty associated with estimating whole body bird residue concentration from seabird eggs of the same species, and would provide current data for use in the predictive model.

Henny (2001) recommended collecting 5 adult birds of each of the 5 species at the same colony where eggs were collected in order to evaluate the egg to whole-body conversion factors used in the predictive model. In addition to the recommendations made by Henny, it would be worthwhile to collect egg and whole-body pelagic cormorants tissues for analysis, since the predictive risk assessment found considerable difference between DDE and PCB residues in double-crested and pelagic cormorants (based on egg to whole-body conversion). The modelers assumed that all cormorants had the same body burden as did double-crested cormorants, which may have skewed the model results. The Fry data from the early 1990s indicated that there is a difference in double-crested cormorant egg residues of DDE between Anacapa Island (mean of 5.96 ppm) versus Santa Barbara Island (mean of 1.11 ppm) (Fry 1994).

Specific species and island combinations (whole body bird) for prey contaminant analysis will be determined based on a statistical power analysis of the data from the 1990s to determine which species/island combination will provide a realistic chance of detecting changes in contaminant concentrations. The number of samples to collect in order to detect temporal changes in DDE and PCB residues in seabirds will also be evaluated. No adult brown pelican, Xantus' murrelet (*Synthliboramphus hypoleuscus*), or ashy storm-petrel (*Oceanodroma homochroa*) will be sacrificed, and no more than 10 adults of other seabird species will be collected. Collections should occur during the 2nd and 3rd year of the feasibility study to coincide with the collection of bald eagle blood for contaminant analysis and stable isotope analysis so interpretation of the results are integrated.

There are limited contaminant residue data from fish and invertebrate prey species for the Northern Channel Islands. No whole body residue data for fish are available. Samples of kelp bass liver and muscle (15 samples total), and bivalve (mussel, 6 samples total)) samples were collected from Anacapa Island in the early 1990s. In contrast, food habit observations recorded 35 different fish and invertebrate species from observations of bald eagles feeding studies on Santa Catalina Island (Valoppi, et al. 2000). Therefore, fish and invertebrate prey of the bald eagle should be collected around the Northern Channel Islands. Samples should be analyzed for both contaminant residues and stable isotopes. Fish and invertebrate samples from the Northern Channel Islands will be collected at the same time as the bird tissues are collected to help with the interpretation of the bald eagle blood data that are collected during

those years. A specific sampling plan detailing the number, species and methods for collecting fish and invertebrate samples will be developed at a later date.

Osprey

Kiff (1980) documented the presence of osprey on the Channel Islands. He indicated that shooting of osprey was likely the most significant cause of their decline, but did not rule out that an environmental change also affected the species. Nonetheless, the latest record of osprey breeding on the Channel Islands is 1927, and it appears that the species declined in the 1920s and 1930s, prior to the releases of DDT into the Southern California Bight.

Henny (2001) noted that osprey historically nested on the Channel Islands (Kiff 1980), and suggested that the fish component of the diets of bald eagle and osprey may be similar because they both catch fish at the surface (as opposed to diving for fish below the surface as cormorants and pelicans do). Henny (2001) noted that since osprey reach sexual maturity 1 or 2 years before the bald eagle and the two species are somewhat equal in their sensitivity to DDE, that reintroduction of osprey to the Northern Channel Islands could provide an early warning system for whether bald eagle breeding would be successful. Henny (2001) suggested that osprey from San Ignacio Lagoon, Baja, Mexico would be a good source of young osprey to release onto the Northern Channel Islands since the nests are easily accessible, and the timing and nesting cycle of these birds is well studied. The Mexican osprey are resident and coastal, and would be preferred over migratory northern osprey. Locating nesting platforms for the osprey would facilitate nesting potential for osprey on the Channel Islands (Henny 2001).

The Institute for Wildlife Studies (IWS) has already initiated hacking of osprey on Santa Catalina Island in 2000 and 2001 (total of 8 birds) from a hack tower on the island. To date, two of the released osprey have died. All released birds have radio transmitters, with expected battery life of about 1 year. IWS hacked northern osprey (which are more migratory than the Mexico birds) onto Catalina Island, and these birds may or may not return to Catalina to breed. IWS plans to monitor the return of the osprey and evaluate their breeding success.

If osprey introduced to the Northern Channel Islands could not breed successfully due to high DDE levels, then it would indicate that it is unlikely that bald eagles would successfully breed. However, if osprey did successfully breed, no conclusion could be drawn as to whether bald eagles would be successful because osprey are slightly less sensitive than bald eagles, and bald eagles ingest more contaminated prey that the osprey do not (i.e. seabirds and marine mammal carcasses). Release of osprey at this time would add additional costs to the feasibility study, and would potentially delay the release of bald eagles. Since the osprey would breed only 1 or 2 years earlier than the bald eagle, and there would still be uncertainty regarding the breeding success for bald eagles, use of osprey as an early indicator does not seem to be the best predictor for success of the bald eagle reintroduction.

Priorities

Although all the elements of the monitoring plan provide information which will be useful for predicting the breeding success of bald eagles, some elements of the plan are more critical than others. The following is a prioritization of the elements, with the most critical element listed first:

1. Radiotelemetry (both radio and satellite) are essential elements for tracking the dispersal of the bald eagles after release. For the bald eagles that remain around the Channel Islands, or for those that return to the islands, telemetry will provide essential information on feeding locations and movements. In particular, telemetry will help identify whether bald eagles are consistently

visiting seabird nesting colonies, and identify the need to conduct direct observations of bald eagle predation on seabirds.

2. Beach Watch Surveys on Santa Cruz Island are essential because they identify the location of marine mammal carcasses which may be available to bald eagles, and allow quantitative data to be gathered on the occurrence, type, frequency, and contaminant concentrations of marine mammal carcasses ingested by bald eagles. This will provide more precise and accurate information to be put into the predictive model to give better estimates of reproductive success. As a secondary benefit, beach watch surveys may provide the opportunity to evaluate techniques to reduce or eliminate bald eagle feeding on marine mammal carcasses (e.g. hazing techniques, removal of carcass from beach, covering of carcass to limit visual attraction by eagles, etc.).

3. Blood monitoring provides the most direct measurement of DDE exposure to eagles, though feasibility of collecting multiple measurements on a given bird is uncertain. The inclusion of other general health parameters also provides data to evaluate indirectly whether there are sufficient food resources to support the bald eagles. Although this is not expected to be an issue, the general health parameters provides assurance that the only limiting factor is contaminants.

4. Prey Contaminant Analysis provides more current monitoring data as inputs to the predictive model and provides a current baseline from which to evaluate any future remedial actions that the U.S. Environmental Protection Agency may undertake.

5. Stable Isotope Analysis, is potentially very useful as a tool to understand the origins and mechanisms of contaminant exposure to individual bald eagles. First, stable isotope analysis will be done on samples from Catalina eagles and foodweb to understand the potential utility and ability of stable isotopes to predict contaminant levels and their relationship to the food web. Second, a non-lethal tissue for stable isotope analysis from released eagles will have to be determined. Finally, the stable isotope data would be collected on the Northern Channel Islands, and used in conjunction with other information (telemetry, contaminant residues, etc.) to understand the degree to which more or less contaminated prey items are used by the released eagles.

Elements and Timing of a Monitoring Plan

Table 1 indicates the timing of the elements of a monitoring plan. The elements marked by an "X" are the highest priority. Some elements are also high priority, but the exact timing of the activity is uncertain (noted by an "X ?" in Table 1). Some elements may or may not be conducted, depending upon the outcome of earlier analysis and the recommendations of the scientific experts (noted by an "?" in Table 1).

Releases of bald eagles would occur during the first 3 - 5 years. Monitoring the movement of eagles would occur for the full 5 years of the feasibility study, as would conducting beach watch surveys to record the presence and location of marine mammals. Video monitoring of marine mammal carcasses to detect bald eagle feeding would potentially occur during the entire 5 years of the feasibility study, as would collecting marine mammal carcass tissue for DDE and PCB residues. No collection of tissue samples from live marine mammals are proposed. Sampling of marine mammal tissues for residue analysis will be opportunistic, it is proposed to collect samples of carcasses during every year of the feasibility study (since it cannot be assured of collecting sufficient samples in any one year). Multiple years of collecting marine mammal carcass tissues may allow for assessment of year to year variation in residue concentrations, as well as potentially capture changes in residue concentrations during El Nino

years. As marine mammal carcass tissues are collected, we will discuss results with the scientific experts to determine the need for continued collections.

Collection of whole body bird and fish samples for residue analysis could occur anytime during the study, but would be best collected in the early part of the study so that trends in data can be evaluated and a determination made whether additional samples are needed. In order to provide some lead time to organizing a collection effort (development of protocols, analytical methods, etc.), bird and fish sample collections should occur in years 2 or 3 of the study. Collecting prey samples for analysis in years 2 or 3 would also coincide with collection of bald eagle blood for residue analysis, thereby allowing better interpretation the bald eagle blood data, and better quantification of contaminant exposure in the risk assessment model.

Capturing bald eagles to take samples on the Northern Channel Islands, Catalina Island, and potentially a reference location, would be conducted in the 2nd through 5th years of the study. It is not known what capture success will be achieved, so attempts to capture should occur throughout the study. There is no need to capture bald eagles during the first year since the contaminant body burdens of the released eagles would not have had time to come into equilibrium with dietary concentrations. Since the bald eagles will be marked with wing tags, collection of blood samples from recently released eagles can be avoided. Blood samples will be collected prior to release to provide a baseline for individual birds.

Stable isotope analysis of archived Catalina samples will occur the first year to evaluate the usefulness of the technique to differentiate between food habits of the various bald eagle territories and to determine whether there is a discernible relationship to stable isotope signature and DDE egg residues or other eagle tissues.

The fifth and sixth years of the study is potentially a transition to nest monitoring and hatch success evaluation, should data collected earlier indicate that DDE exposure is lower than on Catalina Island and a decision in made to continue the bald eagle releases. Details of nest monitoring are not presented in this plan as they are best worked out as more information is obtained during earlier years of the monitoring program, and in consultation with experts.

Impacts of Monitoring Plan on the Environment

There are potential impacts on bald eagles from the capturing of eagles for blood analysis and other non-lethal sampling (e.g. feathers). The effects on bald eagles from this activity are likely to be insignificant because capturing techniques will be employed that have been used successfully by other raptor biologists.

Of the 44 bald eagles fostered into nests or hacked onto Catalina Island since 1989, six have died within the first year. This is considered to be within the normal range of eagle survival in the wild and for a reintroduction program. One adult eagle died, in all likelihood due to DDE poisoning, out of 81 eagles released on Catalina over the 20 years of reintroduction efforts (Garcelon 2000; Sharpe and Garcelon 2000). The Northern Channel Islands are not expected to be more contaminated than the Santa Catalina Island and so DDE exposure to bald eagles is not expected to be greater on the Northern Channel Islands.

As for impacts from collection of adult seabirds for contaminant prey analysis, no more than, no more than 10 adults of any species will be collected. No collection of adult brown pelican, Xantus' murrelet, or ashy storm-petrel will occur. Collection of adult birds is limited to species which have not been identified as having decreasing population trend within the Southern California Bight, so is not expected to impact the environment.

Table 1: Elements and Timeline for Northern Channel Island (NCI) Bald Eagle Reintroduction Feasibility Study

Element	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Release bald eagles to Santa Cruz Island with satellite and conventional radio transmitters; about 12 birds/year.	X	X	X	?	?	
Collect baseline blood data from each bird prior to release.	X	X	X	?	?	
Monitor movement of released birds, intensive monitoring of feeding areas for any birds that remain on islands, or return	X	X	X	X	X	
Conduct beach watch surveys monthly on all Santa Cruz Island for marine mammal carcass diet component of eagles. Potentially also add monitoring of other islands if telemetry warrants.	X	X	X	X	X	
Potentially video monitor eagles feeding on marine mammal carcasses	X	X	X	X	X	
Collect marine mammal carcass tissues for residue analysis. Taking samples each year would provide data on yearly variability in the event of an El Nino event	X	X	X	X	X	
Collect whole body birds for DDE and PCB residues for predictive model		X	X?			
Collect whole body fish and invertebrate samples for DDE and PCB residues for predictive model		X	X?			
Analyze any existing, unanalyzed blood from Catalina eagles and conduct statistical assessment on all available blood residue data	X					
Capture juvenile bald eagles on NCI and Catalina Island for DDE residue and other analysis in blood		X	X	X	X	
Capture juvenile bald eagles at reference area for blood samples, or analyze archived samples from Canada, Oregon, Washington		X	X?	X?	X?	
Stable Isotope Analysis of Catalina egg contents, eggshells, membranes (approximately 30 samples of each)	X	?	?	?	?	
Stable Isotope Analysis of eagle carcass from Catalina (1 carcass, various tissues)	X	?	?	?	?	
Stable Isotope Analysis of blood and feather samples from Catalina birds, construction of a stable isotope food web model, and non-lethal sampling of NCI eagles		?	?	?	?	

Evaluate reproductive success of bald eagle nests (e.g. number of eggs laid and hatch success)					?	?

X = conduct monitoring activity during that year

? = whether to conduct activity depends on analysis of previously conducted analysis

X? = potentially conduct analysis during this year

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Appendix B-Public Involvement

Written Public Comments with Trustee Response

From: Harry Carter" <harry_carter@usgs.gov>

3/2/02 5:07 PM

Subject: Comments on Bald Eagle Reestablishment Plan

To: msrp@noaa.gov

Dear Montrose Settlements Restoration Program,

I have a few comments on the Bald Eagle environmental assessment:

p. 16 - The colony of Cassin's Auklets at Scorpion Rock was estimated at over 300 birds (or over 150 nests) in 1991. Recent unpublished work in 2000-01 has shown that this colony is now much smaller, possibly due to either prey changes or impacts from increased predation by owls or gulls due to squid-boat lights.

TRUSTEES RESPONSE- Thank you for your comment-the relevant sections have been corrected to reflect this updated information

p. 16 - Recent unpublished work in 1994-97 suggests that hundreds of Xantus's Murrelets occur at Anacapa, Santa Cruz, and San Miguel islands, not "a handful". Santa Barbara Island is not the only significant colony of murrelets in the Channel Islands.

TRUSTEES RESPONSE- Thank you for you comments-the relevant sections have been corrected to reflect this updated information

Table 3 - Ashy Storm-Petrels apparently nest at Anacapa Island, based on mist-net captures in 1994 (unpublished data). No nests have been found. Brown Pelicans do not currently nest at Santa Cruz Island (no nesting since about 1975).

TRUSTEES RESPONSE- In Table 3 there is a question mark for Ashy Storm Petrels on Anacapa Island indicating that no confirmed nesting sites have been located on Anacapa Island but that petrels have been captured there which raises the possibility of a nesting colony. The table has been corrected to indicate that Brown Pelican no longer nest on Santa Cruz Island.

p. 35 - Why do the trustees feel that Bald Eagle predation on Xantus's Murrelets and Cassin's Auklets will not have a significant impact on populations of these birds? How many murrelets and auklets are estimated to be eaten annually by the expected population size of eagles? What percentages of local populations of these species are expected to be eaten?

p. 35 - While eagles and seabirds co-existed historically in the northern Channel Islands, the population size and breeding success of Xantus's Murrelets and Ashy Storm-Petrels probably were higher then such that the relative impacts of predation were lower. Now that population sizes and breeding success of these species are likely much lower, the relative impact of eagle predation can be expected to be higher than in the past.

TRUSTEES RESPONSE- As stated on page 35, Sharpe and Garcelon (1999) estimated that alcids would compose only 2.1% of the diet of the reintroduced eagles. At these low levels of predation the Trustees do not anticipate that eagle predation will have a major impact on the auklet populations of the Northern Channel Islands. In addition, on page 36 the Trustees state that Ashy storm- petrels have never been recorded in the diet of bald eagles on Santa Catalina over almost ten years of observing their food habits (Sharpe and Garcelon, 1999). In the 1999 report, Sharpe and Garcelon state that they do not feel that ashy storm-petrels would be other than incidental in the diet of eagles on Santa Cruz. Despite the larger number of ashy storm-petrels breeding on Santa Cruz, we do not expect this species to be a large component of the diet. This is mainly because ashy storm-petrels are nocturnal during the breeding season and nest in sea caves or other secluded areas, both of which makes them largely unavailable to eagles. In addition, ashy storm-petrels are largely pelagic in their foraging areas throughout the year. Also, ashy storm-petrels would provide very low energy benefit for eagles due to their small size when compared to the energy required to capture them (Sharpe personal communication). The Trustees will be monitoring the diets of the reintroduced eagles to determine if the impacts are greater than expected.

p. 36 - At Leach's and Fork-tailed Storm-Petrel colonies in British Columbia and southeastern Alaska where eagle predation has been noted, complete darkness occurs for several hours each night, depending on the time of year and latitude.

TRUSTEES RESPONSE- Comment noted

p. 36 - Ashy Storm-Petrels are resident and attend their breeding colonies in the Channel Islands for most of the year. However, less petrels appear to attend colonies between October and March than during between April and September. They are "largely pelagic" in their foraging areas throughout the year but this may not affect colony visitation itself, except that they do not return every night to the colony.

TRUSTEES RESPONSE- Comment noted

Appendix A

p. f & h - Beach watch surveys at Santa Cruz Island should be designed to include seabird carcasses, as well as marine mammal carcasses. Such surveys should be conducted every 1-2 weeks to best detect deposition patterns and numbers of seabird carcasses. Tissues from fresh beached seabird carcasses could augment other plans to assess contaminant residues in potential prey species. However, carcasses of smaller species (e.g., Xantus's Murrelets and Ashy Storm-Petrels) are unlikely to be found on beaches.

TRUSTEES RESPONSE- The beach watch surveys at Santa Cruz Island will include monitoring of seabird carcasses. Currently the Trustees plan to conduct the surveys once a month due to available funds and personnel. The Trustees may revise this schedule if the initial data indicate that more frequent surveys are necessary. Currently the Trustees are not planning to collect tissues from fresh

beached seabird carcasses due to the additional expense and time that would be required. The Trustees may consider adding this sampling to future monitoring plans.

general comment - Blood samples from Xantus's Murrelets, Cassin's Auklets, Pigeon Guillemots, Ashy Storm-Petrels, and Western Gulls can be easily obtained for contaminant analyses by capturing birds alive at colonies or on the water using nightlighting. For long-term monitoring, I suggest that a potential program using seabird blood samples should be investigated as a cheaper, more reliable, and lower impact method of obtaining samples. If these samples are collected along with egg and whole-body samples, the different techniques could be compared.

TRUSTEES RESPONSE- The Trustees thank you for your comment and will consider monitoring blood samples from murrelets and auklets in the development of future monitoring plans.

Sincerely,

Harry Carter

From: <LKIFF@aol.com>

4/4/02 3:19 PM

Subject: Comments on Bald Eagle Reintroduction Plan

To: msrp@noaa.gov

To whom it may concern:

I am writing to comment on the "Proposed Monitoring Program for Bald Eagle Feasibility Study of Reintroduction to the Northern Channel Island." I am strongly in favor of the program that is being proposed.

As is well documented (e.g., Grinnell and Miller 1944), the Channel Islands contained the most important breeding population of Bald Eagles in California historically, and it is unthinkable that full recovery of this species in the Lower 48 States can occur without the re-establishment of a self-sustaining population of the species in this region. Indeed, full recovery of the species in California to even early twentieth century levels will not have been achieved until there are also birds breeding on the adjacent southern California mainland. Since it is clearly the intent of the Endangered Species Act to effect recovery of all endangered and threatened species (in addition to assuring their survival), there are compelling reasons to take reasonable steps to restore the Bald Eagle to the Channel Islands.

I commend the Trustees for bringing together such a distinguished panel of experts to formulate the plan -- you could not have found better people to suggest elements of a monitoring program. I agree with all of the suggested forms of monitoring, especially those involving the sampling of volant birds and,

eventually, eggs and chicks for DDE residue levels, given the reasonable assumption that this contaminant was the agent responsible for the extirpation of the species on the Channel Islands and is still presumably the chief limiting factor to its full recovery on nearby Santa Catalina Island.

As is obvious from the details in the plan, there are presently few reliable data sets which might be of value in predicting the outcome of the releases, hence any type of monitoring of the birds and their prey for the contaminants listed by Dr. Elliott should be extremely useful. From a timing standpoint, I would rank the sampling of the released birds as being immediately more useful than the analysis of egg contents of the eagles (eventually) or other species.

I was the principal investigator for the seabird eggshell thickness/egg contaminant study conducted on the Channel Islands during the early 1990s, and based on the apparent population sizes then, it is my feeling that the collection of as many as 50 eggs of Ashy Storm-Petrels and Xantus' Murrelet would be excessive. Regardless of the final sample sizes, it should be enlightening to compare current DDE residue levels and eggshell quality with our findings and those from even earlier periods. I will be especially interested to see if investigators still find "classically" crushed Double-crested Cormorant eggs on Anacapa, if those eggs are more heavily loaded with DDE residues than the ones from Santa Barbara Island. Let's hope that the situation is much improved now and that this is reflected by a rapid recolonization of the northern Channel Islands by the Bald Eagles!

Above all, I would emphasize patience in this program. Somewhat by default, I have been closely involved in various endangered species reintroduction programs over the past few decades, including the now completed Peregrine Falcon Recovery Program and the ongoing and now successful ones for the California Condor and Aplomado Falcon. With all of these programs, the early years were often discouraging, which perhaps should be expected, given the largely experimental nature of this type of work. Nevertheless, the population-limiting factors were identified and eliminated one by one, and the recovering populations eventually took off. We saw this, too, with the Central Coast and Channel Islands peregrines, where for many years we were simply involved in a holding action. Keeping these successful programs in mind, I would urge those conducting the releases of Bald Eagles to go into this project for the long term -- the loss of some birds, or even all the birds, during the firs t few years should not cause the abandonment of a recovery effort that is mandated by law and by our shared conservation conscience.

I wish you the best of success with this effort -- for many of us, it is a part of a dream come true!

Regards,

Lloyd Kiff, Star, Idaho

TRUSTEES RESPONSE- Comment noted. The Trustees thank you for your support.

From: spencer berman <a_treehugger@yahoo.com>

4/3/02 10:36 PM

Subject: Bald Eagle comment

To: msrp@noaa.gov

Gentlemen,

I attended the March 28, 2002 general overview of FS/EA for re-establishment of bald eagles on the Channel Islands. Having enjoyed the presentation and finding it very informative, I'm writing in support of the Natural Resource Trustees plan for re-introduction of bald eagles to CINP. Releasing the bald eagle is a symbolic and necessary step in repairing the harm caused by DDT.. Lack of bald eagles has affected the food web and their return hopefully will contribute to the sustenance of the ecosystem. In this post 9/11 time, the sight of our national symbol soaring through the skies over Santa Cruz Island would be an inspirational sight indeed. Something all Americans could be proud of. If a volunteer opportunity arises in the re-introduction program and study, please contact me

I am interested in helping out.

Sincerely,

Spencer Berman

TRUSTEES RESPONSE- Comment noted. The Trustees thank you for your support.

Appendix C-Finding of No Significant Impact
Part 1: National Park Service

Finding of No Significant Impact

Feasibility Study for Reestablishment of Bald Eagles on the northern Channel Islands, California

I. Purpose and Need

Bald eagles (*Haliaeetus leucocephalus*) were a resident breeding species on all of the California Channel Islands from before the turn of the century until at least the 1930s (Willett 1933, Kiff 1980). By the early 1960s, bald eagles had disappeared from all of the Channel Islands. Timing of the decline of eagles on the Channel Islands coincided closely with the loss of peregrine falcons (*Falco peregrinus*) and bald eagles from other portions of their North American range as a result of egg-shell thinning effects of DDE (Kiff 2000, Garcelon 1988). During that same time period, the Montrose Chemical Company and other dischargers released thousands of tons of the pesticide DDT and PCBs into the marine environment of the Southern California Bight. Since the banning of DDT for agricultural uses in the early 1970s, the populations of bald eagles and peregrine falcons have largely recovered in North America. However, populations of these two birds remain impaired today due to the continued presence of DDT in the Southern California Bight .

Bald eagles historically played an important role in the ecology of the Channel Islands by serving as both a top carnivore and a scavenger. Bald eagles prey primarily upon fish taken live from the ocean; however they also feed upon seabirds and the carcasses of animals that wash up on shore.

The bald eagle functions as a top-level coastal predator and scavenger. There is no other species that plays the same ecological role as the bald eagle. In the absence of bald eagles on the northern Channel Islands, golden eagles (not native to the northern Channel Islands) have become established on Santa Cruz Island. Nesting adult bald eagles defend territories and would have excluded golden eagles from establishing on the islands. The golden eagle, a terrestrial predator, has had tremendous negative impacts on native island foxes, a species that does not have evolutionary adaptations to avoid predation (Coonan 2001, Roemer 1999).

In addition to their role in the balance of natural systems, bald eagles were revered by Native American cultures historically occupying the Channel Islands and are still admired and valued by people for whom the bald eagle is both a striking bird and a national symbol.

In 2000, the United States and the State of California settled a ten year lawsuit against the Montrose Chemical Company and other dischargers for the injuries from DDTs and PCBs to birds and fish in the Southern California Bight. The Montrose Settlements Restoration Program (MSRP) Trustee Council is beginning the development of a comprehensive restoration plan to restore the natural marine resources injured by the release of DDTs and PCBs into the southern California Bight. The overall effort is aimed

at restoring, replacing, rehabilitating, or acquiring the equivalent of the injured natural resources and services. The State and Federal Trustees overseeing this process intend to, concurrent with the overall planning effort, fund an approximately five-year study to determine the feasibility of recolonizing the northern Channel Islands with bald eagles given the continued presence of DDT contamination in the food web of the Southern California Bight.

The National Park Service (NPS) is a member of the MSRP Trustee Council and has taken the lead on behalf of the Department of Interior for National Environmental Policy Act compliance for the Feasibility Study.

II. Selected Action

The selected action, and the environmentally preferred alternative, is to conduct an approximately five-year study that will help determine the feasibility of successfully reestablishing a breeding population of bald eagles on the northern Channel Islands given the continued presence of contamination by DDTs and PCBs.

This Feasibility Study will primarily consist of the following actions:

1. Releasing captive-bred or translocated wild nestling bald eagles on Santa Cruz Island using previously developed techniques.
2. Monitoring contaminants in the released birds, their eggs and their food to determine if concentrations of DDE (the primary breakdown product of DDT) are present which may impact the ability of the eagles to successfully reproduce.

Up to twelve eagles will be released annually on Santa Cruz Island over a five-year period. Bald eagles reintroduced to the northern Channel Islands will be obtained from a captive breeding facility. If enough captive birds are not available, birds will be obtained from a wild population robust enough to accommodate removal of offspring without consequences to the wild population.

A plan to monitor juvenile bald eagles released to Santa Cruz Island has been developed based on the recommendations from several experts that research and monitor the effects of organochlorine contaminants in raptors and evaluate techniques for dietary foodwebs. This monitoring plan may use stable isotope analysis, blood analysis, radiotelemetry, and trend analysis to evaluate the sources, exposures, and risks of DDE to bald eagles and the island food web. The monitoring plan is viewed as adaptive and elements of the plan may be changed based upon usefulness of the collected data.

The results of the Feasibility Study will be used by the MSRP Trustee Council to evaluate whether to proceed with a full-scale program to reintroduce bald eagles to the northern Channel Islands. Any determination made to embark on a full-scale restoration program will be done after appropriate additional environmental compliance.

II. Environmental Assessment, Public Review, and Alternatives

An Environmental Assessment (EA) was prepared for this project. The MSRP Trustees notified the public that it intended to prepare an EA in a scoping letter dated June 1, 2001 and requested that comments be forwarded to the Trustees by August 6, 2001. Thirty-eight letters were sent out and the Trustees received eight written scoping comments. On February 26, 2002, forty-one copies of the EA were mailed to the public and government agencies. The announcement of the proposed project and the availability of the EA was sent to over one hundred news offices in southern California and paid notices were placed in the Santa Barbara News-Press, Los Angeles Times, and the Ventura Star. The Feasibility Study/EA was available in both hardcopy and digital format on federal and state agency websites. On March 28, 2002 a public meeting was held at the park headquarters in Ventura, California. Comments on the EA were accepted until April 4, 2002. Three comments were received.

In addition to the proposed action, the alternative of "No Action" was considered. Under this alternative, the Trustees would take no direct action to restore injured natural resources or compensate for lost services pending natural recovery. Instead, the Trustees would rely on natural processes for recovery of the injured natural resources, specifically bald eagles re-populating the northern Channel Islands on their own. While natural recovery of bald eagles to the northern islands might occur over time, there would be continuing injury to the ecosystem through deprivation of the ecological services typically provided by bald eagles. The "No Action" alternative was not selected because it would not meet the goal of providing the MSRP Trustees with information to determine if bald eagles could be restored to the northern Channel Islands given the continued presence of DDTs and PCBs in the marine environment of the Southern California Bight.

The MSRP Trustees determined that two additional courses of action would not be fully assessed in the Environmental Assessment because the actions would not allow the Trustees to fulfill their objective of determining the feasibility of recolonizing the northern Channel Islands with bald eagles. The actions that were not evaluated in the EA were: a) Monitor bald eagles on Catalina Island to determine feasibility of establishing bald eagles on the northern Channel Islands, and b) Determine the feasibility of reintroducing bald eagles to the northern Channel Islands by studying DDT contamination in likely eagle prey items.

III. Summary of Public Comments:

Comments regarding this project were received from ten different individuals or agencies. Most commenters were supportive of the project proposal. Issues raised focused primarily on the impacts of the feeding habits of bald eagles.

Bald eagles primarily feed on fish and carrion, and are therefore unlikely to have significant impacts on other wildlife living on or around the Channel Islands. The diet of bald eagles is likely to differ greatly according to the age of the bird (Sharpe and Garcelon, 1999). The diet of bald eagles less than two years of age would primarily consist of scavenged food and the birds would have access to food located anywhere on the island because of their lack of territoriality (Sharpe and Garcelon, 1999). Bald eagles

more than two years old would feed mainly on fish. Sharpe and Garcelon (1999) estimated that fish would compose 87% of the bald eagle diet on Santa Cruz/Anacapa Islands. This is based on diet observations of eagles on Santa Catalina Island and the assumption that the fish abundance around the northern islands is similar to that around Santa Catalina. However, the composition of the diet may vary between islands due to differing availability of food. A historical bald eagle nest on San Miguel Island consisted primarily of bones of fish, large seabirds, and pinniped pups (P. Collins, pers. comm.).

Two commenters expressed concern regarding the potential impact of bald eagles on seabirds, particularly on Xantus's murrelets and ashy storm-petrels. Both of these birds are species of concern that may be listed in the near future under the federal Endangered Species Act as endangered or threatened. They also expressed concern regarding predation by bald eagles on surface nesting seabirds, such as western gulls, common murres (former breeders at Prince Islet), on the federally endangered California brown pelicans and on the three breeding species of cormorants.

Bald eagles will prey upon avian species, particularly medium to large-sized seabirds such as gulls (*Larus* spp.), grebes, cormorants, and loons. None of theses seabirds are threatened or endangered species around the northern Channel Islands.

Bald eagles may take smaller bird species, either alive or as carrion (Garcelon 1997). Sharpe and Garcelon (1999) estimated that alcids could compose 2.1% of the diet of bald eagles on Santa Cruz Island. At these levels, the Trustees feel that bald eagles will not have a significant impact on the populations of these birds. The diet of reintroduced bald eagles will be monitored to determine if alcids are comprising a larger percentage of the diet.

Bald eagles had a long historical presence on the Channel Islands prior to their extirpation and presumably coexisted with the seabird populations there. However, as pointed out by commenters, some seabird populations, particularly Xantus's murrelet and Ashy storm-petrel, are severely depressed as compared to historical populations and there is concern that any additional predation may inhibit protection or recovery of these species.

We do not understand all of the factors that contributed to the decline of these seabirds. Several of the same agencies that are MSRP Trustees are taking the significant and beneficial action of eradicating rats from Anacapa Island to restore breeding habitat for Xantus's murrelet and Ashy storm-petrel. Elimination of rats should result in increases of the populations of both seabird species on Anacapa Island and should more than offset any mortality from bald eagle predation.

Additional scoping comments raised concerns related to disturbance by eagles of surface-nesting seabirds. Studies on the surface-nesting common murre along the Oregon and Washington coast demonstrated impacts of eagles on these populations by flushing and thereby exposing their eggs to other bird and mammal predation.

The situation in the Channel Islands, however, is substantially different as most of the surface-nesting seabirds consist of brown pelicans, three species of cormorants and western gulls. A bald eagle soaring close over a pelican colony may flush roosting birds

and those in loafing groups on the periphery of the colony, but it is unlikely that a nesting bird would be dislodged (Gress comment letter). Western gulls and cormorants may be more vulnerable to bald eagle predation and harassment but it is unlikely that this will cause a significant impact, such as colony abandonment or reduced breeding success (Gress comment letter). Bald eagles were part of the original bird community of the Channel Islands and historical seabird populations were not severely affected by them (Anderson comment letter).

Two commenters questioned whether bald eagles would prey on island fox, a species proposed by the U.S. Fish & Wildlife Service for listing as endangered. The typical feeding habits of the bald eagle, observations from Catalina Island (where both bald eagles and island foxes are present), and examination of prey remains in a 100-year old bald eagle nest on San Miguel Island (P. Collins, pers. comm.) support the conclusion that bald eagles will not adversely affect island foxes. The U.S. Fish & Wildlife Service concurs with this determination.

We feel that the substantive issues raised by commenters are adequately addressed in the EA. We do not believe that any issues raised point to the potential for significant negative impacts. The EA supports the conclusion that the environmental impacts of the feasibility study will be negligible or minor. During the feasibility study, the eagles will be monitored to determine the environmental impacts of the study.

This project will not result in adverse effects to federally endangered, threatened, or proposed species on the Channel Islands. The U.S. Fish and Wildlife Service concurred with this determination in a letter dated April 5, 2002.

IV. Assessment of potential for impairment of park resources

The NPS Organic Act and the General Authorities Act prohibit the NPS from undertaking activities that would impair park resources. NPS Management Policies (Sec. 1.4.5) indicate that impairments are those actions or projects that "would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values."

The proposed feasibility study is a step towards correcting an impairment that occurred to the ecosystem of the Channel Islands. If bald eagles are successfully reestablished on the Channel Islands, this will result in the park supporting a greater portion of its' natural biological diversity.

Bald eagles are largely scavengers, however, they do prey on birds and fish. Bald eagles are not expected to contribute to future endangerment of any species. In fact, predation by bald eagles in the Channel Islands ecosystem is a natural process that is integral to a naturally functioning ecosystem. There will be short-term, minimal impacts to soils and vegetation at the site of hack box construction. This level of impact does not impair park resources and is an unavoidable result of reestablishing a native species.

The NPS has determined that the feasibility study will not result in impairment of the resources or values of Channel Islands National Park.

V. Conclusion

Based on the EA, the comments received from the public review, and the assessment of agency biologists, the NPS has determined that the proposed action is not a major federal action that would significantly affect the human environment. Therefore, the proposal will be implemented and an environmental impact statement will not be prepared.

Recommended: Tim Setnicka 4/23/02

Tim J. Setnicka — Date

Superintendent

Concurred: 4-24-02

Acting for Steve Thompson D. KENNETH McDERMOND — Date

Manager, California/Nevada Operations Office

U.S. Fish & Wildlife Service

Approved: Patricia D. Newbacher 4/26/02

for John Reynolds — Date

Regional Director

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Appendix C-Finding of No Significant Impact
Part 2: National Oceanic and Atmospheric Administration

FINDING OF NO SIGNIFICANT IMPACT
Feasibility Study for Reestablishment of Bald Eagles on
the northern Channel Islands, California

Bald eagles (*Haliaeetus leucocephalus*) were a resident breeding species on all of the California Channel Islands from before the turn of the century until at least the 1930s. By the early 1960s, bald eagles had disappeared from all of the Channel Islands. Timing of the decline of eagles on the Channel Islands coincided closely with the loss of peregrine falcons (*Falco peregrinus*) and bald eagles from other portions of their North American range as a result of egg-shell thinning effects of DDE. During that same time period, the Montrose Chemical Company and other dischargers released thousands of tons of the pesticide DDT and PCBs into the marine environment of the Southern California Bight. Since the banning of DDT for agricultural uses in the early 1970s, the populations of bald eagles and peregrine falcons have largely recovered in North America. However, populations of these two birds remain impaired today due to the continued presence of DDT in the Southern California Bight.

In 2000, the United States and the State of California settled a ten-year lawsuit against the Montrose Chemical Company and other dischargers for the injuries from DDTs and PCBs to birds and fish in the Southern California Bight. The Montrose Settlements Restoration Program (MSRP) Trustee Council is beginning the development of a comprehensive restoration plan to restore the natural marine resources injured by the release of DDTs and PCBs into the southern California Bight. The overall effort is aimed at restoring, replacing, rehabilitating, or acquiring the equivalent of the injured natural resources and services. The State and Federal Trustees overseeing this process intend to, concurrent with the overall planning effort, fund an approximately five-year study to determine the feasibility of recolonizing the northern Channel Islands with bald eagles given the continued presence of DDT contamination in the food web of the Southern California Bight.

The National Park Service (NPS) is a member of the MSRP Trustee Council and has taken the lead on behalf of the Department of Interior for National Environmental Policy Act compliance for the Feasibility Study. NOAA is undertaking this FONSI as a MSRP Trustee Council Member.

The selected action (environmentally preferred alternative) is to conduct an approximately five-year study that will help determine the feasibility of successfully reestablishing a breeding population of bald eagles on the northern Channel Islands given the continued presence of contamination by DDTs and PCBs. This Feasibility Study will primarily consist of the following actions: 1.) Releasing captive-bred or translocated wild nestling bald eagles on Santa Cruz Island using previously developed techniques. and 2.) Monitoring contaminants in the released birds, their eggs and their food to determine if concentrations of DDE (the primary breakdown product of DDT) are present which may impact the ability of the eagles to successfully reproduce.

Up to twelve eagles will be released annually on Santa Cruz Island over a five-year period. Bald eagles reintroduced to the northern Channel Islands will be obtained from a captive breeding facility. If enough captive birds are not available, birds will be obtained from a wild population robust enough to accommodate removal of offspring without consequences to the wild population. Research monitoring will be undertaken to assess the effects of organochlorine contaminants in raptors and evaluate techniques for dietary foodwebs. This monitoring plan may use stable isotope analysis, blood analysis, radiotelemetry, and trend analysis to evaluate the sources, exposures, and risks of DDE to bald eagles and the island food web. The results of these research efforts will be used to develop a Feasibility Study for the MSRP Trustee Council to evaluate whether to proceed with a full-scale program to reintroduce bald eagles to the northern Channel Islands. Any determination made to embark on a full-scale restoration program will be done after appropriate additional environmental compliance.

The MSRP Trustees notified the public that it intended to prepare an EA in June 2001 and requested comments. Trustees received eight written scoping comments. In February 2002, copies of the EA were mailed to the public and government agencies, notice of availability of the EA was sent to over one hundred news offices in southern California, and paid notices were placed in the Santa Barbara News-Press, Los Angeles Times, and the Ventura Star. The Feasibility Study/EA was available in both hardcopy and digital format on federal and state agency websites. On March 28, 2002 a public meeting was held at the park headquarters in Ventura, California. Comments on the EA were accepted until April 4, 2002. Three comments were received. Comments were supportive of the project proposal. Some concern was expressed on the potential impacts from bald eagles feeding habits. Bald eagles primarily feed on fish and carrion, and are therefore unlikely to have significant impacts on other wildlife living on or around the Channel Islands.

DETERMINATION

Based upon an environmental review and evaluation of the Environmental Assessment for the Feasibility Study for Reestablishment of Bald Eagles on the northern Channel Islands, California, the comments received from the public review, and the assessment of agency biologists, I have determined that the proposed action is not a major federal action that would significantly affect the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. Accordingly, an environmental impact statement is not required for this feasibility study.

William T. Hogarth Date: 5/10/02

William T. Hogarth, Ph.D.
Assistant Administrator for Fisheries
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Appendix D-State of California Categorical Exemption

Notice of Exemption

Form D

To: ☒ Office of Planning and Research
PO Box 3044, 1400 Tenth Street. Room 222
Sacramento, CA 95812-3044

☐ County Clerk
County of _____

From: (Public Agency) Dept. Fish and Game
1416 Ninth Street
Sacramento, CA 95814
(Address)

Project Title: Feasibility Study for Reestablishment of Bald Eagles on the Northern Channel Islands, California

Project Location - Specific:
Channel Islands National Park
Northern Channel Islands, California

Project Location – City: --- **Project Location – County:** near Santa Barbara, Ventura, Los Angeles and Orange Count

Description of Project:
Conducting a feasibility study in which captive-bred or translocated wild nestling bald eagles will be released onto Santa Cruz Island. Using previously utilized techniques, contaminant levels will be monito in the released birds and/or their eggs to determine if concentrations of DDT are accumulating which may impact the ability of the eagles to successfully reproduce.

Name of Public Agency Approving Project: Dept. of Fish and Game

Name of Person or Agency Carrying Out Project: Montrose Settlements Restoration Progra including Dept. of Fish and Game, State Lands Commission, State Parks

Exempt Status: (*check one*)

☐ Ministerial (Sec. 21080(b)(1); 15268);
☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
☒ Categorical Exemption. State type and section number: 15306, Information Collection; 15307, Actions by Regulatory Agencies for Protection of Natural Resources; 1530 Actions by Reg. Agencies for Protecti of the Environment
☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:

This Feasibility Study consists of basic data collection, research and experimental management/activities which do not result in a serious or major disturbance to an environmental resource but which will help determine if bald eagles can be restored to their historic range.

Lead Agency
Contact Person: Patty Velez Area Code/Telephone/Extension: 831-649-2876

If filed by applicant:
1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ Date: _____ Title: Deputy Director
Deputy Director, Habitat Conservation, Dept. of Fish and Game
☒ Signed by Lead Agency

☐ Signed by Applicant

RECEIVED
APR 11 2002

Date received for filing at OPR: _____

Revised May 1999